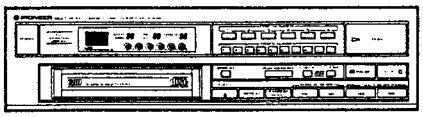
PIONEER

Service Manual

CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS



ORDER NO.
ARP1271-A

COMPACT DISK PLAYER

PD-X99M

- This service manual is applicable to the HEM, HB and SD types.
- As to the HB and SD types please refer to pages 77.
- Ce manuel d'instruction se refère au mode réglage, en français.
- Este manual de servicio trata del método ajuste escrito en español.

MODEL PD-X99M COMES IN THREE VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Power requirement	Export destination
HEM	AC220V, 240V*	European continent
HB	AC220V, 240V*	United Kingdom
SD	AC110V,120V-127V,220V,240V(switchable)	General market

* Change the primary wiring of the power transformer.

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1. SPECIFICATIONS

1. General

Type.....Compact disc digital audio system
Usable discs .....Compact Disc
Signal format.....Sampling frequency: 44.1 kHz
Sampling bit number: 16 bit linear
Power requirements
European models.....AC 220 V, 50/60 Hz
U.K., Australian models.....AC 240 V, 50/60 Hz
U.S., Canadian models.....AC 120 V, 60 Hz
Other models.....AC 110/120 – 127/220/240 V (switchable) 50/60 Hz
Power consumption ..... 23 W
Operating temperature.....+5 °C — +35 °C
Weight.....5.6 kg (12lb 6 oz)
External dimensions.....360(W) x 315(D) x93(H) mm
14-3/16(W) x 12-13/32(D) x 3-11/16(H) in

2. Audio section

Frequency response.....4 Hz - 20 kHz (±0.5 dB) (EIAJ)
S/N ratio.....more than 97 dB (EIAJ)
Dynamic range .....more than 94 dB (EIAJ)
Channel separation.....more than 92 dB (EIAJ)
Harmonic distortion.....less than 0,004 % (EIAJ)
Output voltage.....2.0 V ±0.5 V (EIAJ)
Wow and flutter.....less than (±0.001 %W.PEAK) (below measurable level)(EIAJ)
Channels.....2-channel (stereo)

3. Functions

- Play
- Pause
- Manual search
- Track search
- Random playback
- Pause program
- Direct track search
- All track repeat
- One-tune repeat
- One-disc repeat
- Programmed playback
- Programmed repeat
- Direct programming

4. Accessories

- Six-compact-disc magazine 1
- Output cable.....1
- Control cord.....1
- Operating instructions 1

NOTE:
Specifications and design subject to possible modification without notice, due to improvements.

2. PANEL FACILITIES

FRONT PANEL

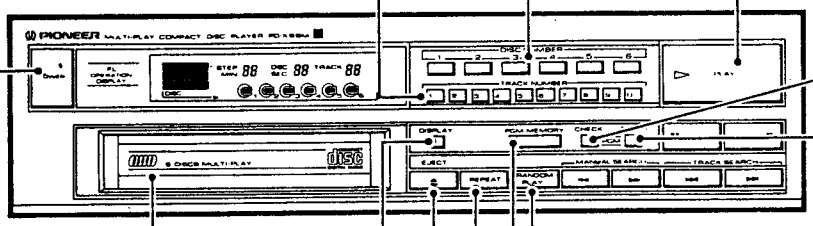
POWER switch
Press to turn power to the unit ON and OFF.

DISC NO. keys (DISC NUMBER 1 - 6)
Use to select disc numbers for playback or programming.

TRACK NO. keys (TRACK NUMBER 1 - 0)
Use to select track numbers (track 1 - track 99) for playback or programming.

CHECK key
Press to check the contents of the program. Pressing this key when the player is stopped will cause each successive program step and programmed disc number and track number to be displayed by the indicators, each time the CHECK key is pressed.

PLAY key and indicator
Press to begin playback, and to release the player from the pause mode.



CLEAR key
Press to clear program.

Magazine insertion slot

RANDOM PLAY key
Press to begin random playback.

PROGRAM (PGM MEMORY) key
Use to program a sequence of tracks.
- Press this key after selecting a desired disc and track with disc and track number keys. Tunes will be added to the program in the order in which they are specified.
- If only a disc number key is pressed, all tracks on the specified disc will be added to the program. The letters AL will appear on the indicator.

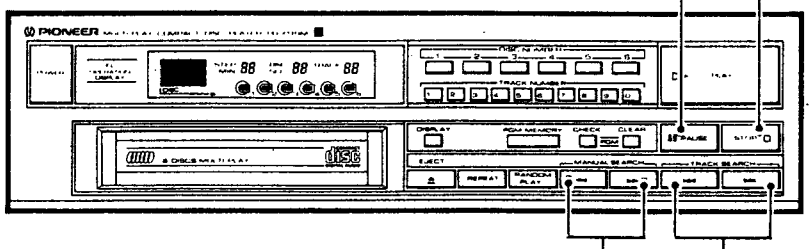
DISPLAY key
Changes the indicator displays.
- If pressed once during playback or pause mode, the display of elapsed playback time will be replaced with a display of the total playback time of a single disc and the total number of tracks. (The original display will be restored after 3.5 seconds.)
- If pressed twice in succession during playback or pause modes, the display will be replaced with a display of the disc number and track number. Pressing once again will restore the original display.

REPEAT key
Press to perform repeat playback
- If pressed during normal playback mode, all tracks on the disc will be played back repeatedly.
- If pressed during programmed playback, the programmed tracks will be repeatedly played back in the programmed order.

EJECT key
Press to eject a magazine or the disc tray. When pressed, any magazine (in case of single magazine, the disc tray) inside is expelled forward.

PAUSE key and indicator
Press to temporarily interrupt playback. When pressed again, the player is released from the pause mode.

STOP key
Press to stop playback. When pressed all operations stop.



MANUAL SEARCH keys
When the player is in play or pause modes, these keys are pressed to perform fast forward or fast backward operations, to allow manual searching. These operations are only carried out during the time either key is pressed. If pressed for more than 2 seconds, the speed increases.

(►►) : Fast forward operation (If fast forward operation is performed to the end of the disc, END will be indicated and the player will enter pause mode)

(◄◄) : Fast backward operation (If fast backward operation is performed to the beginning of the disc, the player will enter pause mode.) If these operations are performed during programmed play mode, the player will enter pause mode just before transferring to the next (or previous) step.

TRACK SEARCH keys
When the player is in the normal play, programmed play or pause modes, these keys are pressed to search for a desired track. Pressing either key causes the player to advance to the next track, or return to the previous track. The keys can also be used to check the contents of a program during program entry (but only when the player is stopped).

[►►|] : When pressed once, the disc playback advances to the beginning of the next track on the disc; when pressed continuously, the disc playback moves to the beginning of succeeding tracks on the disc. (During programmed playback, it moves to the beginning of the next programmed track.)

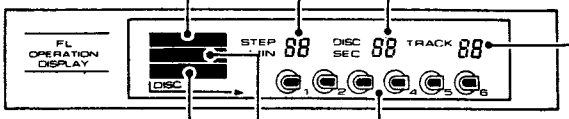
[|◄◄] : When pressed once, the disc playback returns to the beginning of the currently playing track; when pressed continuously, the disc playback moves further in reverse to the beginning of previous tracks on the disc. (During programmed playback it returns to the beginning of the previously programmed track.)

Indicators

STEP/MIN : Indicates program step (01 - 32) during play or search, or indicates time minute units.

PROGRAM : Lights after programming (after program has been memorized).

DISC/SEC : Indicates disc number (1 - 6) during play or search, or indicates time second units.



RANDOM : Lights during random playing.

REPEAT : Lights during repeat play.

DISC : Indicates the disc during play or search.

TRACK : Indicates track number (01 - 99) during play or search.

REAR PANEL

AUDIO OUT terminals

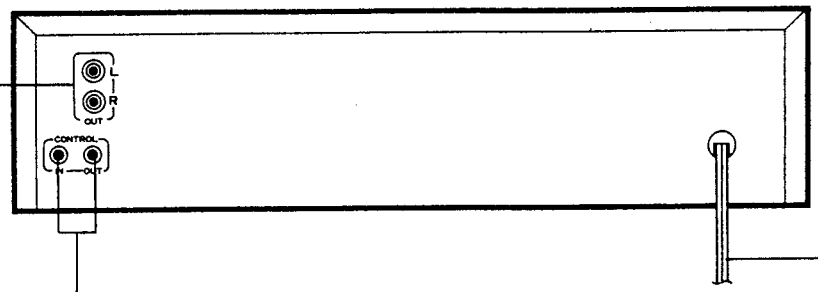


Illustration not applicable to U. K. model.

Power cord

Control input terminal
This terminal is for inputting the remote control signals relayed from an amplifier or other component with a sensor for receiving control signals from a remote controller and carrying the Pioneer SR mark. Please connect to the control output terminal of the other component.

Control output terminal
This terminal is for further relaying remote control signals to other components carrying the Pioneer SR mark. Please connect to the control input terminal of the other component.

3. EXPLODED VIEWS AND PARTS LIST

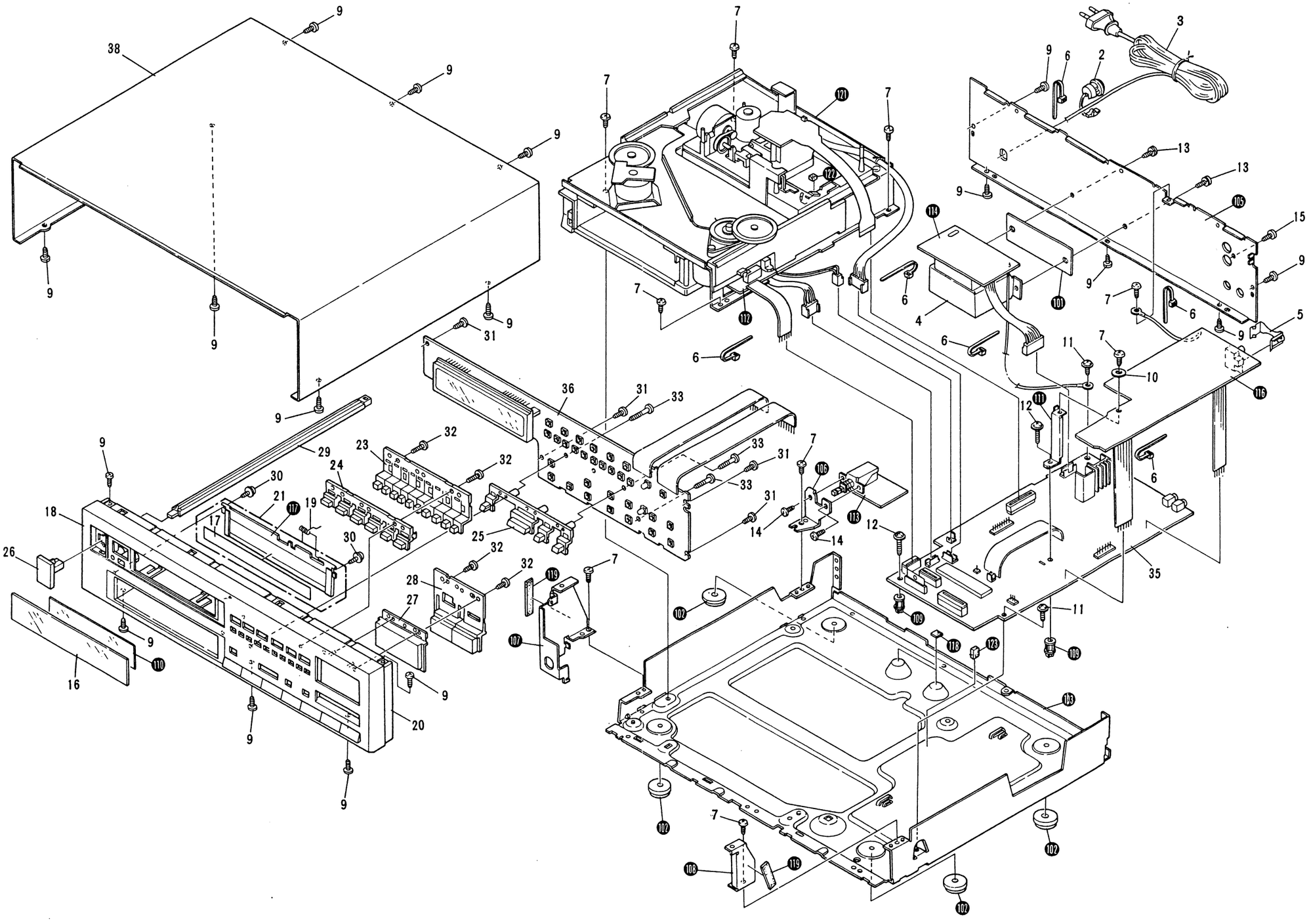
3.1 EXTERIOR

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification should be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

• Parts List

Mark	No.	Part No.	Description
	1.	.....	.....
⚠	2.	CM-22B	Strain relief
⚠	3.	PDG1008	AC power cord
⚠ ★	4.	PTT-250	Power transformer (AC220V/240V)
	5.	PBK1001	GND plate
	6.	PEC-030	Binder
	7.	BBZ30P060FCC	Screw
	8.	.....	.....
	9.	BBZ30P060FZK	Screw
	10.	WA30W100R100	Washer
	11.	IBZ30P060FCC	Screw
	12.	IBZ30P150FCU	Screw
	13.	PMA40P080FZK	Screw
	14.	PMZ30P060FCU	Screw
	15.	PPZ30P080FZK	Screw
	16.	PAM1037	Window
	17.	PAM1038	Name plate
	18.	PAN1026	Front panel
	19.	PBH-456	Door spring
	20.	PXA1018	Function panel assembly
	21.	PYY1020	Door assembly
	22.	.....	.....
	23.	PAC-320	Track button
	24.	PAC-387	Disk button
	25.	PAC1007	Program button
	26.	PAC1079	Power button
	27.	PAD1009	Play button unit
	28.	PAD1010	S/P button unit
	29.	PNY-528	Power switch joint
	30.	IPZ30P060FMC	Screw
	31.	PPZ30P080FMC	Screw
	32.	PPZ30P120FMC	Screw
	33.	PPZ30P220FMC	Screw
	34.	.....	.....
⚠ ◉	35.	PWZ1165	Main board assembly
⚠ ◉	36.	PWZ1167	Function board assembly
	37.	.....	.....
	38.	PNA1016	Bonnet
	101.		Spacer
	102.		Foot
	103.		Base
	104.		.....
	105.		Rear panel
	106.		Switch angle
	107.		Front angle (A)
	108.		Front angle (C)
	109.		PCB spacer
	110.		FL filter
	111.		P.C. Board setting angle
	112.		Select board assembly
	113.		Power switch board assembly
	114.		Transformer board assembly
	115.		.....
	116.		Audio board assembly
	117.		Door
	118.		Rubber sheet
	119.		Rubber sheet (B)
	120.		.....
	121.		Mechanism assembly
	122.		Cushion
	123.		Spacer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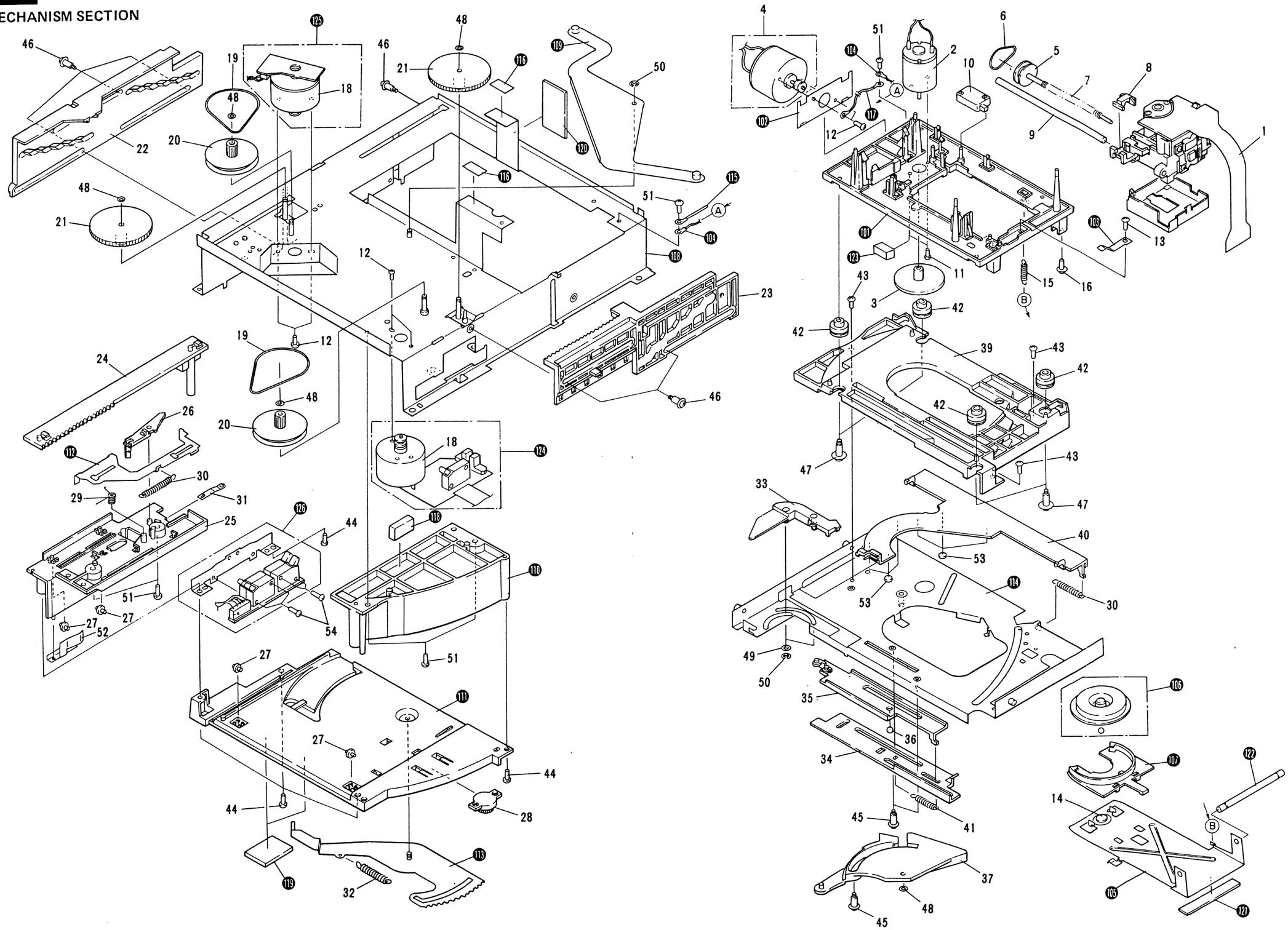
3.2 MECHANISM SECTION

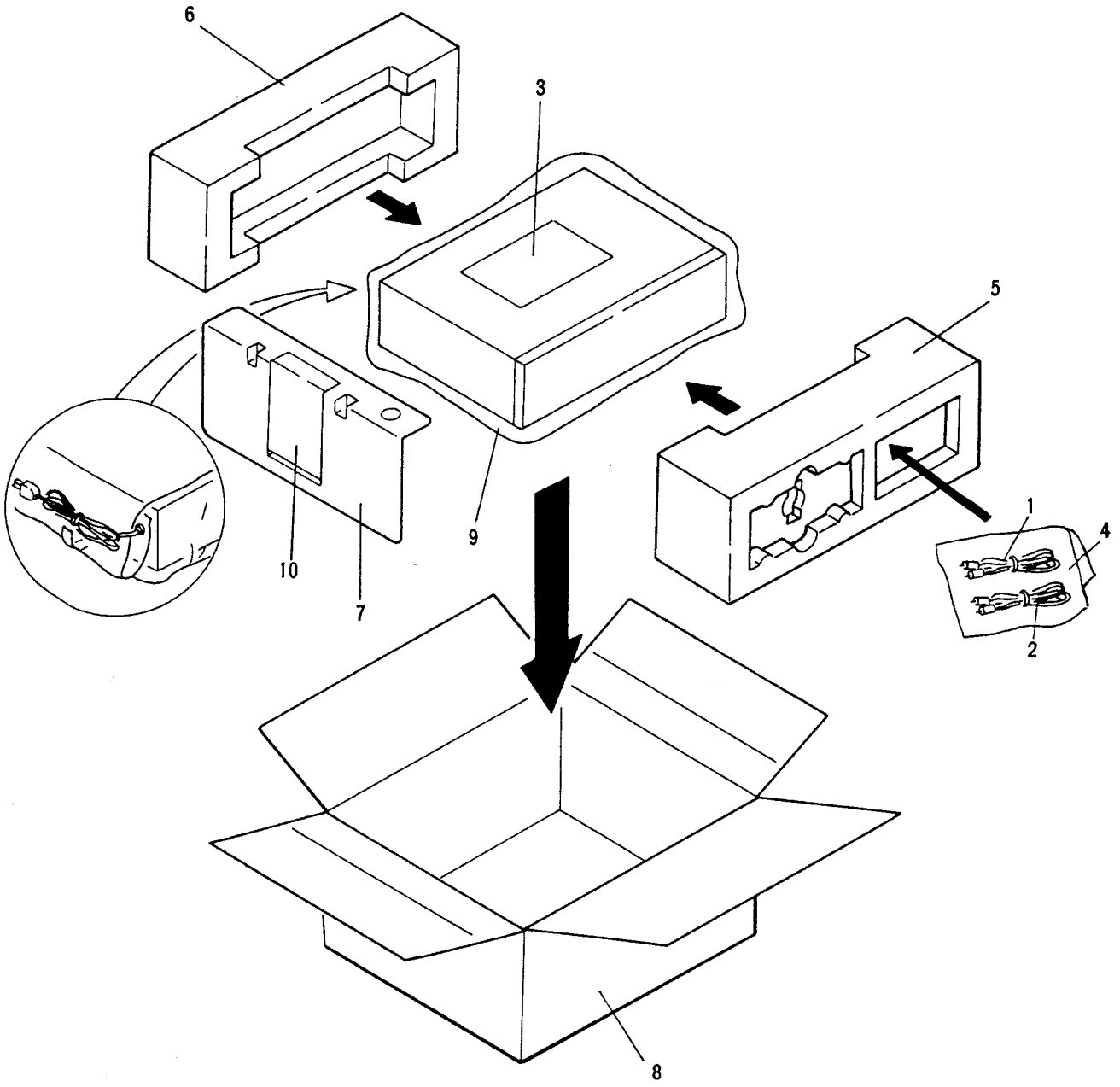


Parts List of Mechanism Assembly

Mark	No.	Part No.	Description
	1.	PWY-006	Pickup assembly
★★	2.	PXM-147	Spindle motor
	3.	PNY-613	Disc table
★★	4.	PYY-504	Motor assembly (CARRIAGE)
	5.	PNY-499	Pulley
★★	6.	PEB-314	Belt
	7.	PLB-282	Driver screw
	8.	PNY-500	Nut
	9.	PLB-272	Guide bar
★★	10.	PSH-007	Slide switch (INSIDE, S101)
	11.	PMZ20P030FMC	Screw
	12.	PMZ26P040FMC	Screw
	13.	BBZ30P060FMC	Screw
	14.	VNL-268	Receptacle
	15.	PBH-436	Clamper spring
	16.	IPZ30P080FMC	Screw
	17.	.....	.....
★★	18.	PYY-507	Motor assembly (DISC SELECT, LOADING)
★★	19.	PEB-315	Belt
	20.	PNY-379	Gear
	21.	PNY-501	Gear
	22.	PNY-502	Stair (L)
	23.	PNY-503	Stair (R)
	24.	PNY-504	Rack
	25.	PNY-505	Side guide (L)
	26.	PNY-585	Lock lever
	27.	PNY-386	Roller
	28.	PXC-016	Damper assembly
	29.	PBH-437	Twist spring
	30.	PBH-438	Multi spring
	31.	PBK-087	Press spring
	32.	PBH-465	Eject spring
	33.	PNY-509	Lever
	34.	PNY-510	Differential lever
	35.	PNY-511	Drive lever
	36.	PBP-001	Steel ball
	37.	PNY-512	Swing lever
	38.	.....	.....
	39.	PNY-514	Disc guide
	40.	PNY-515	Upper tray

Mark	No.	Part No.	Description
	41.	PBH-466	Spring
	42.	PEB-316	Float rubber
	43.	BBZ30P060FMC	Screw
	44.	PPZ30P100FMC	Screw
	45.	PBA-112	Screw
	46.	PBA-125	Screw
	47.	PBA-188	Screw
	48.	WT25D047D025	Washer
	49.	WA31D054D025	Washer
	50.	YE25F	Washer
	51.	BBZ30P060FCC	Screw
	52.	PBK-101	Side spring
	53.	PED-049	Cushion
	54.	PMZ26P150FMC	Screw
	101.		Mechanism chassis
	102.		Motor base
	103.		Guide bar retainer
	104.		GND lead unit
	105.		Clamper holder
	106.		Clamper
	107.	PNY-498	Clamper guide
	108.		Main chassis
	109.		Lever
	110.	PNY-506	Side guide R
	111.		Bottom guide
	112.		SM select
	113.		Eject lever
	114.		Sub chassis
	115.		Cord retainer
	116.		Felt
	117.		GND lead unit
	118.		BS spacer
	119.		Sheet
	120.		BS damper
	121.		LPF damper
	122.		Holder axis
	123.		Magnet
	124.		Select board assembly
	125.		Loading board assembly
	126.		Switch board assembly

4. PACKING



• Parts List of Packing

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	PDE-319	Connection cord with mini-plug		5.	PHA1003	Protector (F)
	2.	PDE1001	Connection cord with pin-plug		6.	PHA1005	Protector (R)
	3.	PRE1013	Operating instructions (English/German/French/Italian)		7.	PHC-119	Magazine holder
					8.	PHG1036	Packing case
	4.	Z21-013	Polyethylene bag		9.	Z23-007	Mirror mat sheet
					10.	PXC-027	Magazine assembly

5. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω	*56 × 10¹*	*561 ..... RD¼PS* 5 6 1	*J*
47kΩ	*47 × 10³*	*473 ..... RD¼PS* 4 7 3	*J*
0.5Ω	*0R5 ..... RN2H* 0 R 5		*K*
1Ω	*010 ..... RS1P* 0 1 0		*K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621 .... RN¼SR* 5 6 2 1	*F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★ .*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification should be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

MISCELLANEOUS PARTS

Mark	Symbol & Description	Part No.
⚠ ◉	Main board assembly	PWZ1165
⚠ ◉	Function board assembly	PWZ1167
	Audio board assembly	Non supply
⚠	Power switch board assembly	Non supply
	Select board assembly	Non supply
	Loading board assembly	Non supply
	Switch board assembly	Non supply
⚠	Transformer board assembly	Non supply
⚠	Strain relief	CM-22B
⚠	AC power cord	PDG1008
★★	Motor assembly (DISC SELECT, LOADING)	PYY-507
★★	Motor assembly (CARRIAGE)	PYY-504
★★	Motor (SPINDLE)	PXM-147
★★	S101 Slide switch (INSIDE)	PSH-007
	Pick-up assembly	PWY-006

Main Board Assembly (PWZ1165)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC21	AN78L12
⚠ ★★	IC23	AN78M05F
★★	IC20	AN79L12
⚠ ★★	IC22	AN79M05F
★★	IC4, IC27	BA6109
★★	IC10	CXK5816M-12L (CXK5816M-15L)
★★	IC6	CX20108
★★	IC5	CX20109
★★	IC9	CX23035
⚠ ★★	IC24, IC25	ICP-F15
★★	IC32	M51957AL
★★	IC8	M5238LF
★★	IC11	PDE003
★★	IC12	PD3079
⚠ ★★	IC2, IC3	TA7256P
★★	Q22	DTC124ES
★★	Q23	2SA1048 (2SA1015)
★★	Q21	2SA933S
★	D6	KV1225YBR (KV1226YBR)
★	D4	MTZ11C
★	D3, D24	MTZ5.1B (MTZ5.1C)
★	D23	RD27EB2 (RD27EB3)
★	D13 – D22	S5566B
★	D27, D28, D41 – D43	1SS254

COILS

Mark	Symbol & Description	Part No.
	VL1 VCO coil	PTL-031
	L4 – L6 Inductor	LRA010K

CAPACITORS

Mark	Symbol & Description	Part No.
	C61, C62	CCCCH30OJ50
	C29	CCCCH33OJ50
	C8, C31	CCCSL101J50
	C46, C66, C67	CCCSL221J50
	C71, C72	CCCSL30OJ50

Mark	Symbol & Description	Part No.
	C25, C26	CCCSL470J50
	C14, C21, C27	CCCSL560J50
	C7	CCCSL680J50
	C52	CCCUJ221J50
	C53	CCCUJ330J50
	C44	CEANP010M50
	C48	CEANL010M50
	C49	CEANP100M25
	C34, C57	CEANP2R2M50
	C42	CEASR33M50
	C22	CEASR47M50
	C137, C138	CEAS101M50
	C133, C134	CEAS102M16
	C129, C130 (2200μF/25V)	PCH1042
	C135, C136	CEAS222M25
	C5, C6, C17, C19, C23, C36, C38, C50, C68, C70, C162	CEAS330M35
	C139	CEAS470M50
	C127, C128 (1000μF/16V)	PCH1036
	C11 – C13, C47, C63 – C65, C115	CKCYF103Z50
	C10, C199	CKCYF473Z50
	C9	CKCYX473M25
	C37	CQMA102J50
	C55, C60	CQMA103J50
	C56	CQMA104J50
	C15, C39, C41	CQMA104K50
	C16, C45	CQMA222J50
	C30, C59	CQMA223J50
	C33	CQMA224J50
	C20	CQMA333J50
	C28	CQMA472J50
	C40	CQMA682J50
	C35, C43	CQMA683J50
	C58	CQMA822J50

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR3, VR4 Semi-fixed (10kΩ)	VRTB6VS103
★	VR5 Semi-fixed (100kΩ)	VRTB6VS104
★	VR2, VR6 Semi-fixed (47kΩ)	VRTB6VS473
	R112 (10kΩ x 4)	RA4S103J
	R101 (47kΩ x 4)	RA4S473J
	R111 (10kΩ x 7)	RA7S103J
	R113 (10kΩ x 8)	RA8S103J
	R8, R9	RD1/2PM4R7J
	R117	RD1/4PM103J
	R11	RD1/4PM2R7J
	R63, R85	RN1/6PQ1003F
	R62	RN1/6PQ5601F
	R84	RN1/6PQ6801F
⚠	R190	RD1/6PM3R6J
	Other resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
★	X3 Ceramic resonator	KBR-800H
★	X2 Ceramic resonator (4.00MHZ)	VSS-018
★	X1 Crystal resonator	PSS-012
	JA3,JA4 3.5φminijack	RKN-071

Function Board Assembly (PWZ1167)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC201	PD4063
★★	Q201, Q203	DTC124ES
★★	Q205 – Q209	2SC1740S
★	D214	MTZ5.1B (MTZ5.1C)
★	D211	SLH-56YC3H
★	D203 – D210	1SS254
★	D215	SLR-54MUYC3H

SWITCHES

Mark	Symbol & Description	Part No.
★★	S201 – S230 Tact switch (OPERATION)	PSG-064

COILS

Mark	Symbol & Description	Part No.
	L201, L202 Inductor	LAL03TA1R0M

CAPACITORS

Mark	Symbol & Description	Part No.
	C202, C203	CCCSL331J50
	C204	CEAL100M16
	C201	CEAL3R3M50
	C205	CKCYF103Z50
	C206	CKPUYF103Z25

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R214	RD1/6PM124J
	R206	RD1/6PM683J
	Other resistors	RD1/4PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
★	V201 Fluorescent tube	PEL1001
★	X201 Ceramic resonator	RSS-034

Audio Board Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC19	BU4053B
★★	IC15	CX20152
★★	IC17, IC18	M5238PF
★★	Q12	2SA933SLN (2SA933LN)
★★	Q17, Q18	2SD1302
★★	Q13, Q14	2SK505
★	D7, D8, D25, D26	HZ6A1L (HZ6A2L)

FILTERS AND COIL

Mark	Symbol & Description		Part No.
	F1, F2	Low pass filter	PTF-008
	L1	Inductor	LRA010K

CAPACITORS

Mark	Symbol & Description	Part No.
	C90, C123, C124	CEAS100M50
	C97, C98	CEAS101M25
	C117, C118	CEAS220M50
	C85, C87, C89, C92	CEAS330M35
	C96, C111	CKCYF103Z50
	C86	CQMA103K50
	C99 – C104, C107, C108	CQMA104K50
	C144	CQMA333K50
	C109, C110, C121, C122	CQSF102J125
	C125, C126	CQSF221J125
	C82, C84 (22p)	PCL-055
	C81 (0.001μ)	PCL1001
	C83 (18P)	VCF-005
	C88	CFTXA105J50

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R125	RD1/6PM101J
	R122	RD1/6PM223J
	R155, R156	RD1/6PM391J
	R131, R132	RD1/6PM472J
	R119	RD1/6PM473J
	R143, R144, R147 – R150, R129	RDR1/4PM □□□J
	Other resistors	RD1/4PM□□□J

OTHERS

Mark	Symbol & Description		Part No.
	JA1	2P pin jack (OUTPUT)	PKB-014
★	X4	Crystal resonator	PSS-008

Power Switch Board Assembly

SWITCH

Mark	Symbol & Description		Part No.
⚠ ★★	S401	Push switch (POWER)	PSA-009

CAPACITOR

Mark	Symbol & Description		Part No.
⚠	C401	(0.01μ)	RCG-009 (VCG-044)

Transformer Board Assembly

CAPACITORS

Mark	Symbol & Description	Part No.
⚠	C402, C405, C406	CKCYF103Z50
	C403, C404, C407 – C410	CKCYF103Z50

TRANSFORMER

Mark	Symbol & Description	Part No.
⚠ ★	T1 Power transformer (AC220V/240V)	PTT-250

Select Board Assembly

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
★★	Q601	GP1A01

SWITCH

Mark	Symbol & Description		Part No.
★★	S601	Slide switch	PSH-006

CAPACITORS

Mark	Symbol & Description	Part No.
	C601	CEAS100M50
	C602	CKDYF103Z50

RESISTORS

Mark	Symbol & Description	Part No.
	R601	RD1/6PM471J
	R602	RD1/6PM473J

Loading Board Assembly

No parts will be supplied with this circuit board.

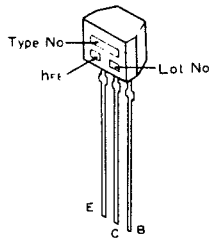
Switch Board Assembly

SWITCHES

Mark	Symbol & Description		Part No.
★★	S701 – S704	Slide switch	PSH-006

External Appearance of Transistors and ICs

2SA1048



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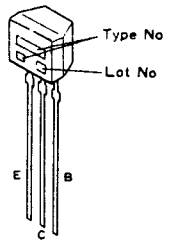

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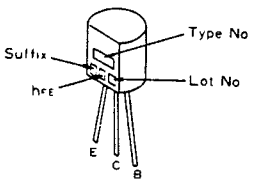

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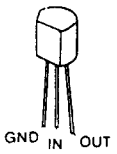

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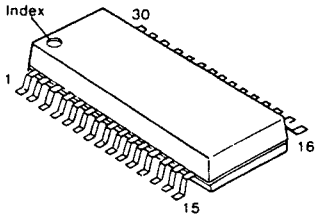

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2SC1740S
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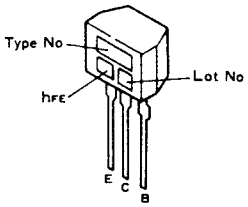

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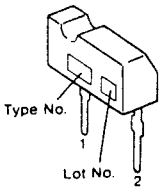

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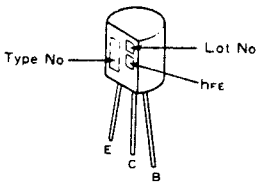

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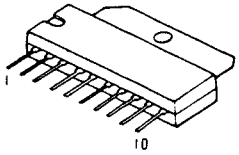

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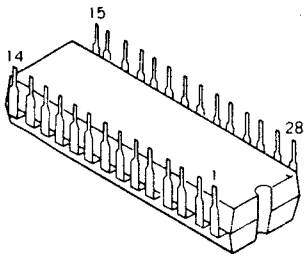

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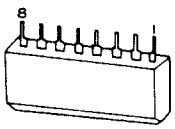

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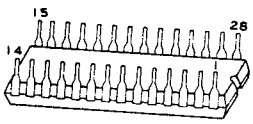

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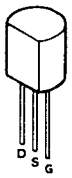

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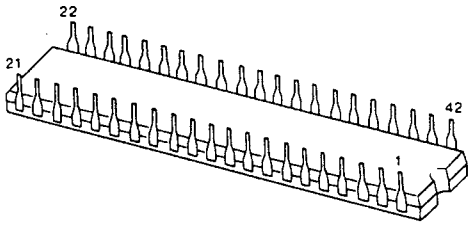

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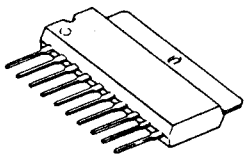

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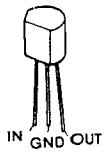

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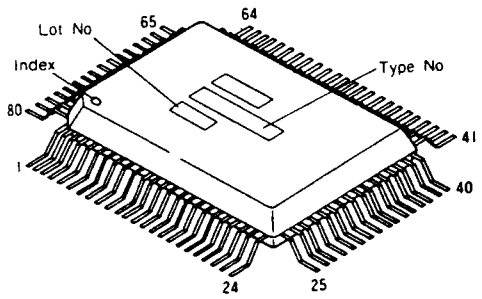

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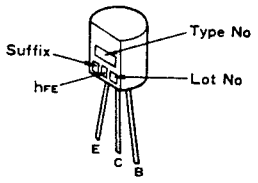

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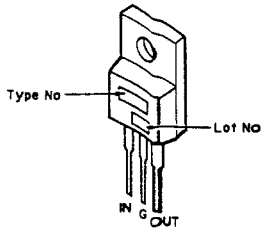

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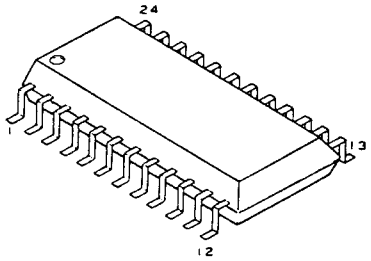

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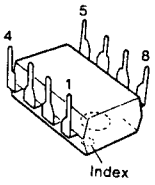

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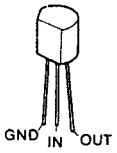

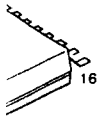

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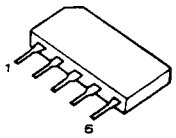

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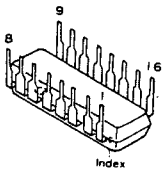

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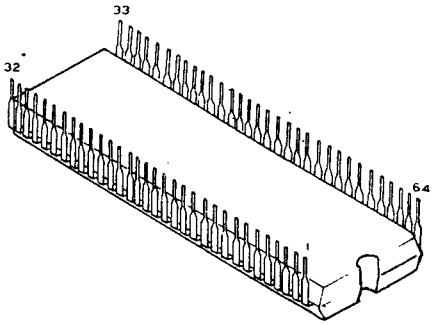

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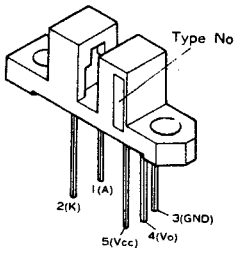
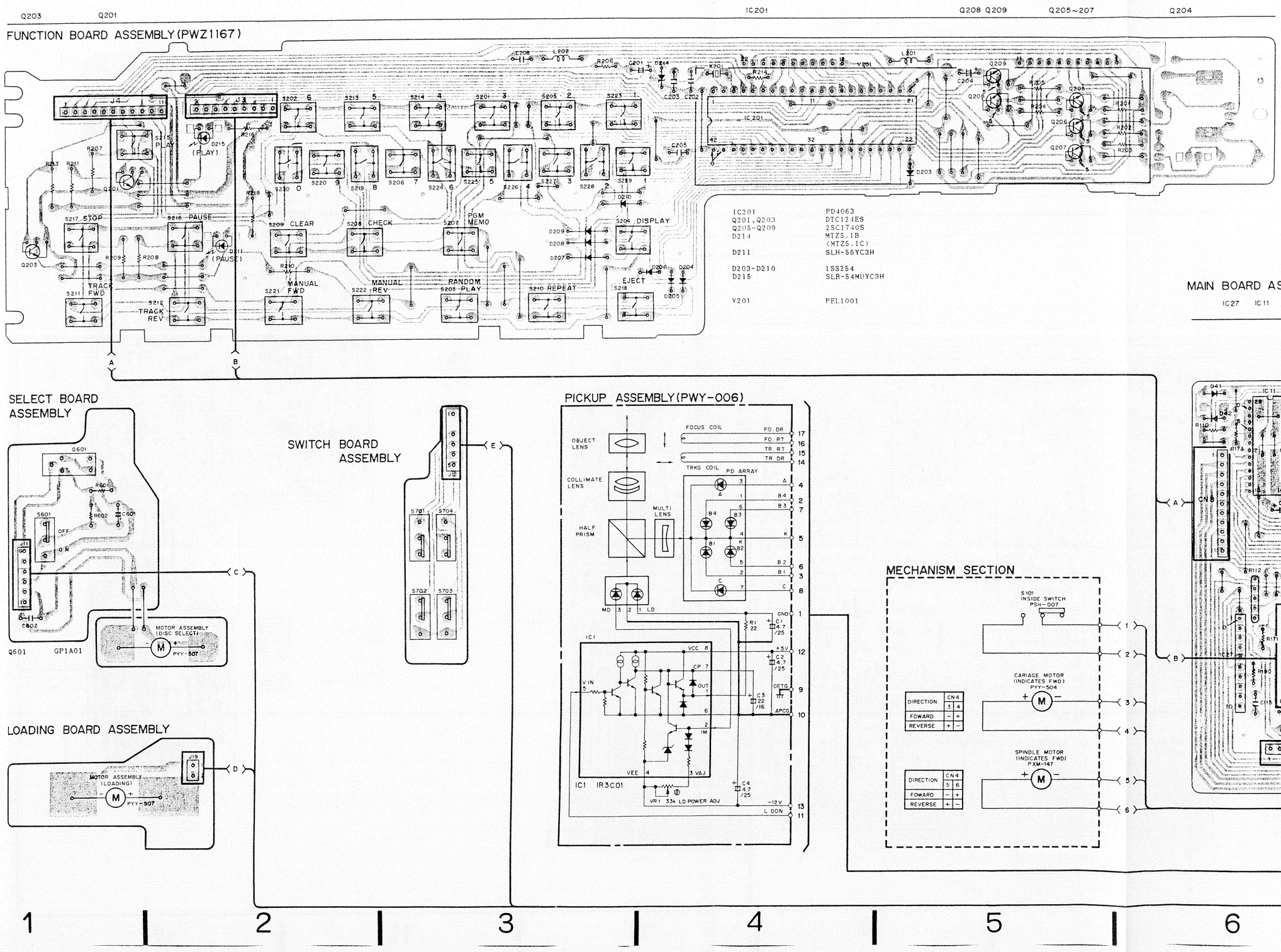


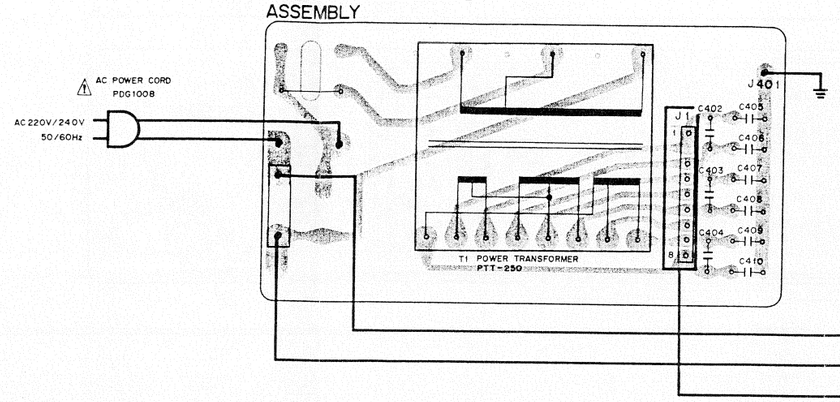
Lot No

6. SCHEMATIC DIAGRAM AND P. C. BOARDS CONNECTION DIAGRAM

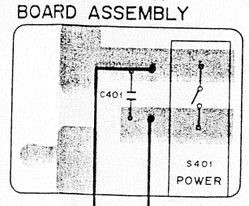
6.1 P.C. BOARDS CONNECTION DIAGRAM



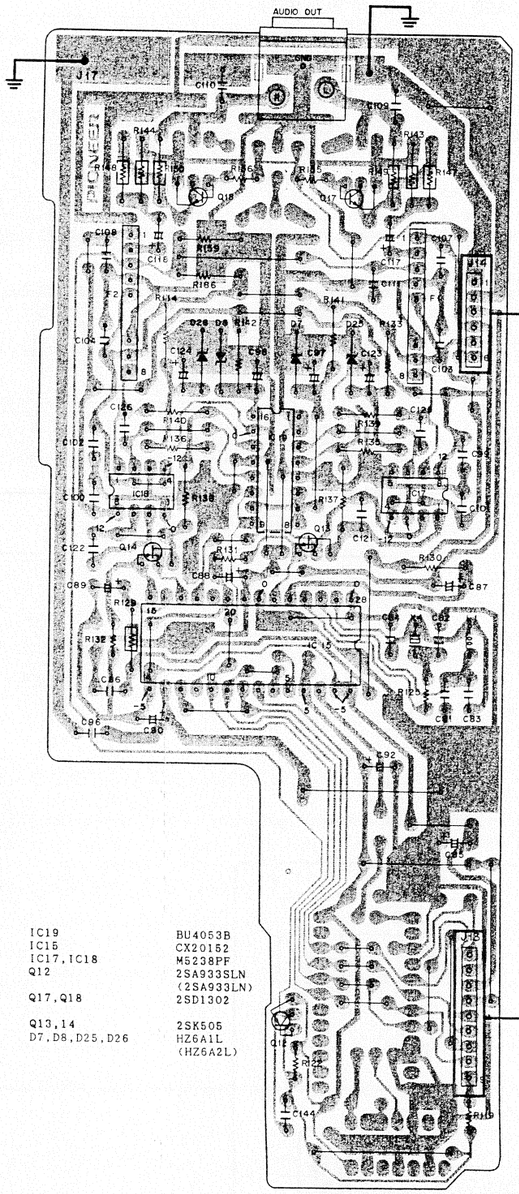
TRANSFORMER BOARD ASSEMBLY



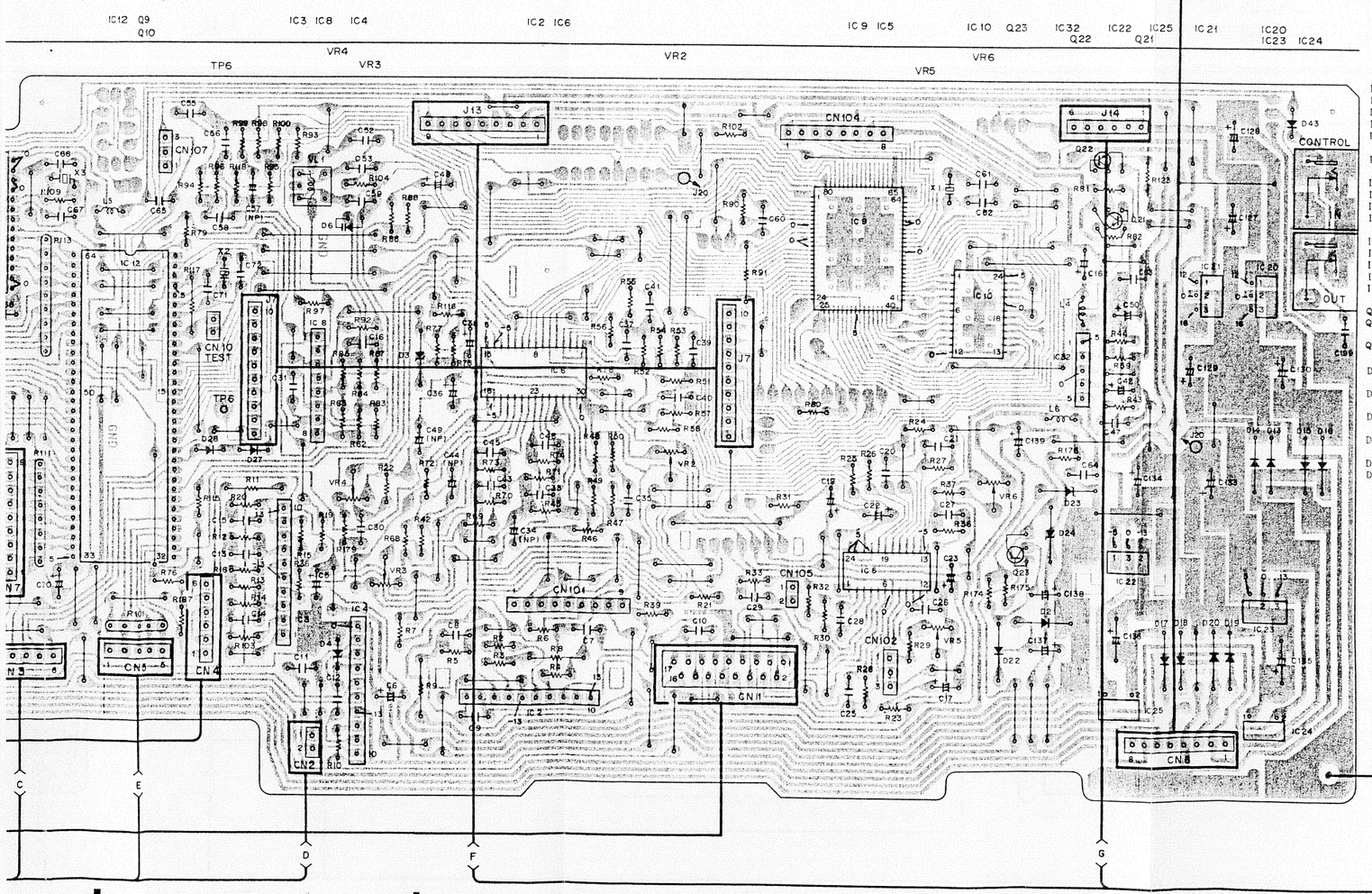
POWER SWITCH BOARD ASSEMBLY



AUDIO BOARD ASSEMBLY



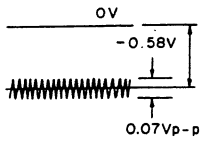
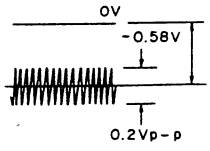
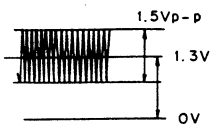
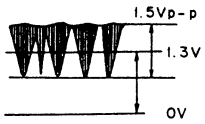
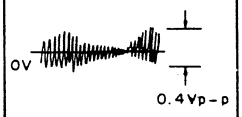
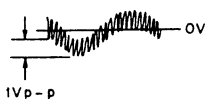
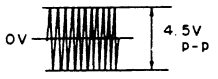
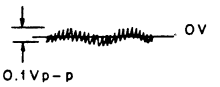
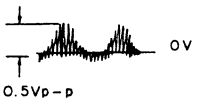
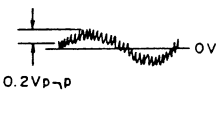
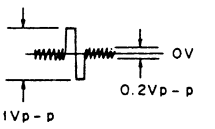
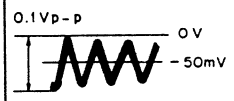
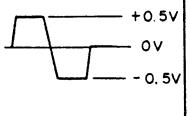
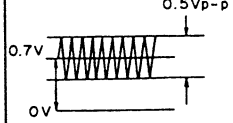
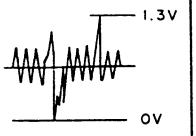
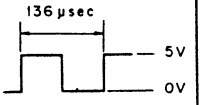
SEMBLY(PWZ1165)

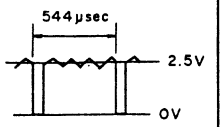
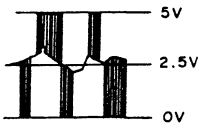
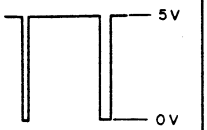
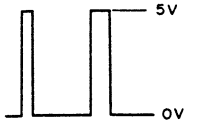
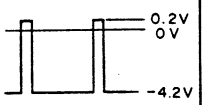
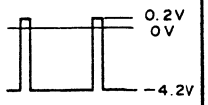
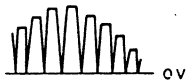
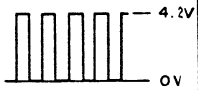


IC21	AN78L12
IC23	AN78M05F
IC20	AN79L12
IC22	AN79M05F
IC4, IC27	BA6109
IC10	CXK5816M-12L (CXK5816M-15L)
IC6	CX20108
IC5	CX20109
IC9	CX23035
IC24, IC25	ICP-F15
IC32	M51957AL
IC8	M5238LF
IC11	PDE003
IC12	PD3079
IC2, IC3	TA7256P
Q22	DTC124ES
Q23	2SA1048 (2SA1015)
Q21	2SA933S
D6	KV1225YBR (KV1226YBR)
D4	MTZ11C
D3, D24	MTZ5.1B (MTZ5.1C)
D23	RD27EB2 (RD27EB3)
D13-D22	S5566B
D27, D28, D41-D43	1SS254
IC19	BU4053B
IC15	CX20152
IC17, IC18	M5238PF
Q12	2SA933SLN (2SA933LN)
Q17, Q18	2SD1302
Q13, 14	2SK505
D7, D8, D25, D26	HZ6A1L (HZ6A2L)

• Wave Forms

Note: The wave form voltage and time values are general guides only.

	PLAY	SEARCH
①		
②		
③		
④		
⑤		
⑥		
⑦		
⑧		
⑨		

	PLAY	SEARCH
⑩		
⑪		
⑫		
⑬		
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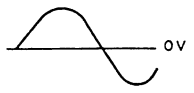
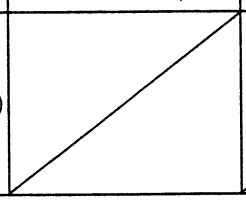
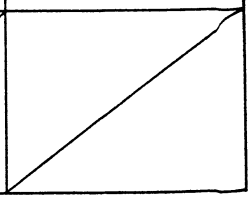
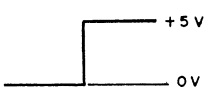
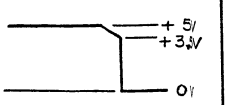
⑮		
⑯		

	POWER ON	POWER OFF
⑰		

NOTE:

1. RESISTORS.
   Indicated in Ω, ¼W, ⅛ W,±5% tolerance unless otherwise noted k; kΩ, M; MΩ, (F); ±1%, (G); ±2%, (K); ±10%, (M); ±20% tolerance

2. CAPACITORS:
   Indicated in capacity (μF)/voltage (V) unless otherwise noted p; pF. Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE
   ⌜□⌟; DC voltage (V) at no input signal

4. OTHERS:
   ⏚ ; Ground to chassis.
   ➡ ; Signal route.
   ⊘ ; Adjusting point.

The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
✱ marked capacitors and resistors have parts numbers.

SWITCHES:

OUTSIDE OF P. C. BOARD ASSEMBLY
S101 : INSIDE ON - OFF

FUNCTION BOARD ASSEMBLY
S201 : 3 (DISC NUMBER)
S202 : 6 (DISC NUMBER)
S203 : RANDOM PLAY
S204 : DISPLAY
S205 : 2 (DISC NUMBER)
S206 : 7 (TRACK NUMBER)
S207 : PGM MEMORY
S208 : CHECK
S209 : CLEAR
S210 : REPEAT
S211 : TRACK SEARCH (⏭)
S212 : TRACK SEARCH (⏮)
S213 : 5 (DISC NUMBER)
S214 : 4 (DISC NUMBER)
S215 : PLAY
S216 : PAUSE
S217 : STOP
S218 : EJECT
S219 : 8 (TRACK NUMBER)
S220 : 9 (TRACK NUMBER)
S221 : MANUAL SEARCH (▶▶)
S222 : MANUAL SEARCH (◀◀)
S223 : 1 (DISK NUMBER)
S224 : 6 (TRACK NUMBER)
S225 : 5 (TRACK NUMBER)
S226 : 4 (TRACK NUMBER)
S227 : 3 (TRACK NUMBER)
S228 : 2 (TRACK NUMBER)
S229 : 1 (TRACK NUMBER)
S230 : 0 (TRACK NUMBER)

POWER SWITCH BOARD ASSEMBLY
S401 : POWER ON - OFF

SELECT BOARD ASSEMBLY
S601 : DISC SELECTOR ON - OFF
(HOME POSITION SW) (HOME POSITION – OUTSIDE OF HOME POSITION)

MECHANISM BOARD ASSEMBLY
S701 (LPS 1) : } LOAD POSITION SW
S702 (LPS 2) : }

	STOP	During the loading	Clamp condition PLAY	during the eject
S701	ON (H)	OFF (L)	OFF (L)	ON (H)
S702	ON (H)	ON (H)	OFF (L)	OFF (L)

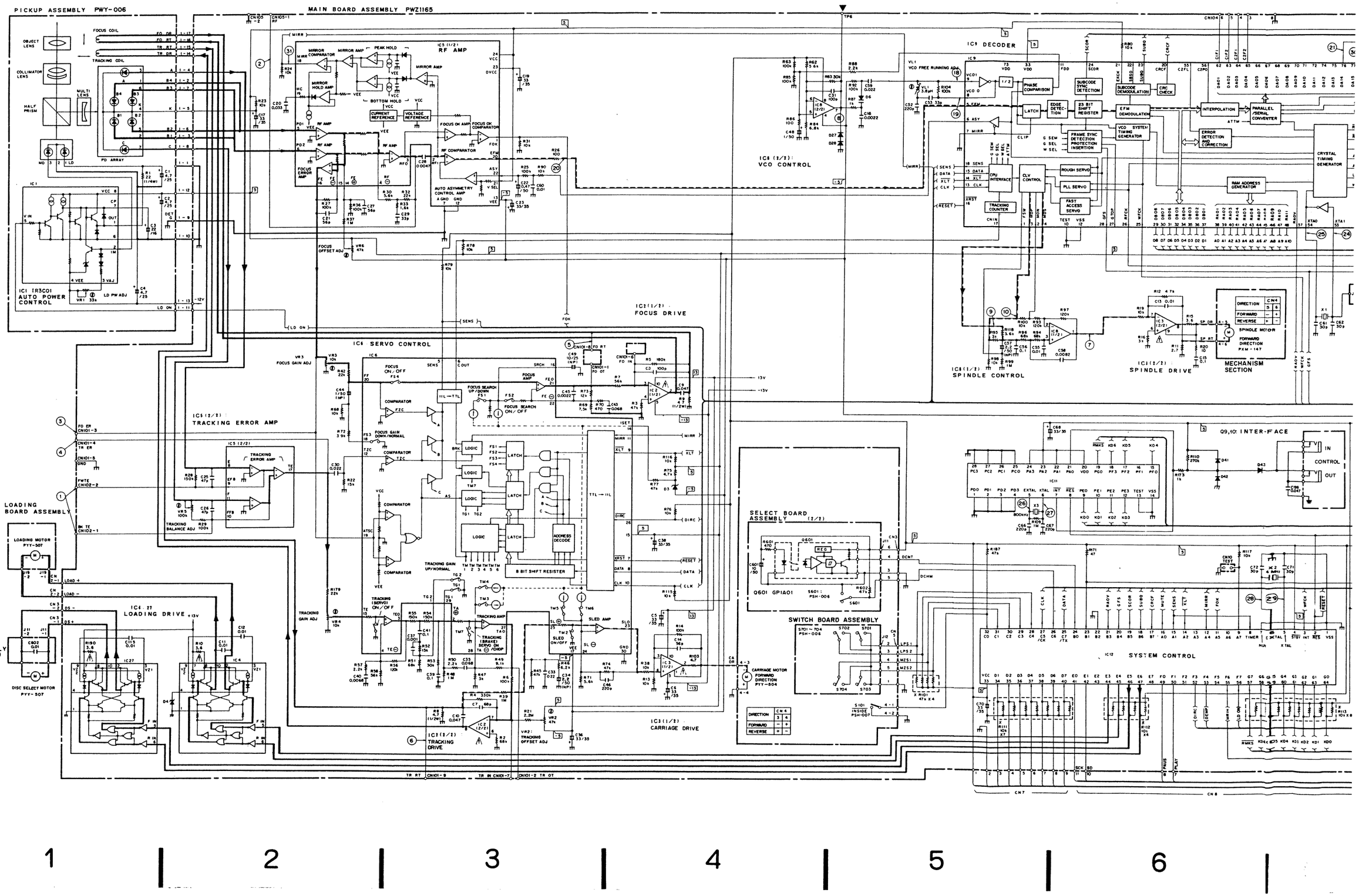
S703 (MZS 2) : } MAGAZINE DISCRIMINATE SW
S704 (MZS 1) : }

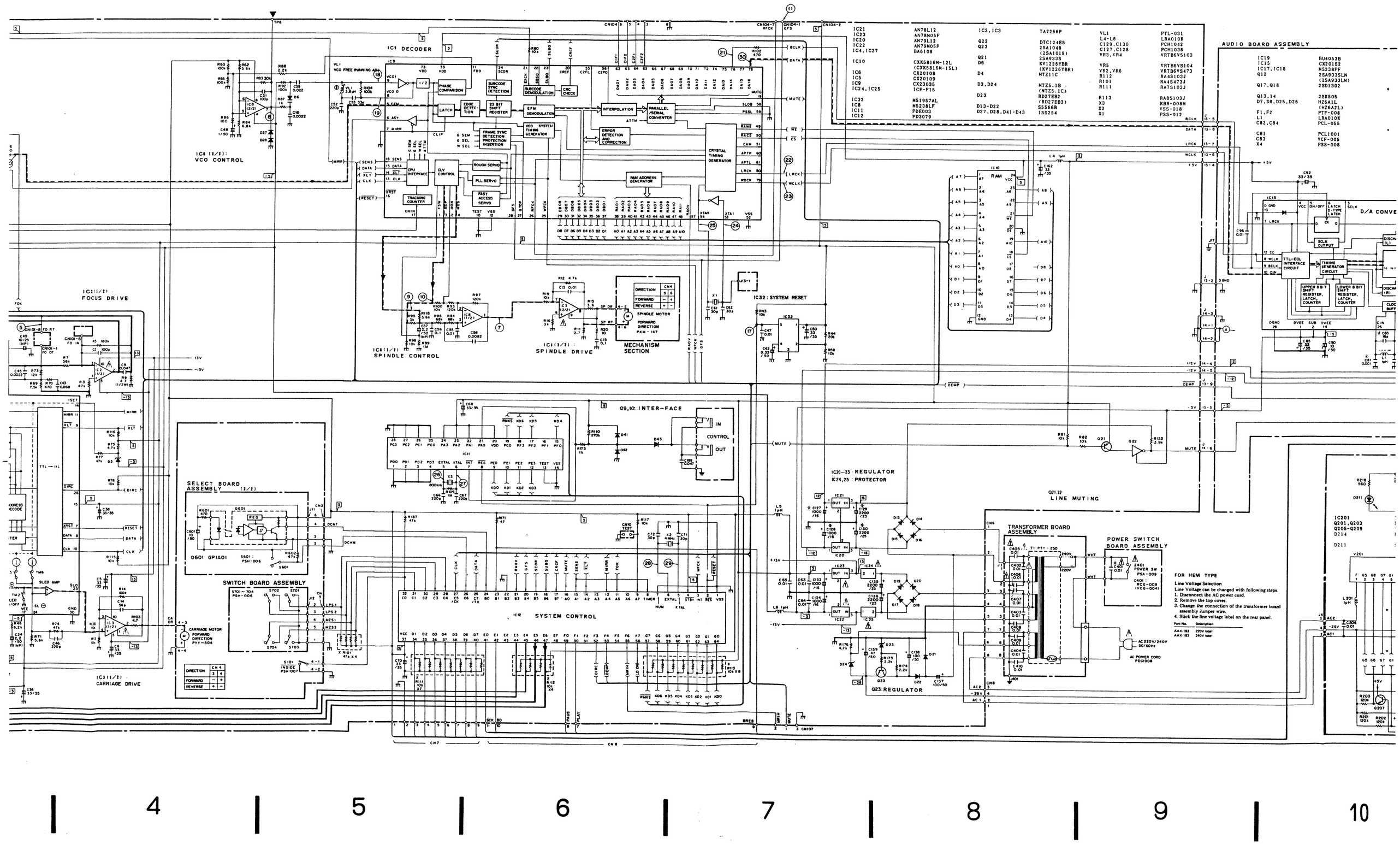
	NO MAGAZINE	SIX MAGAZINE	SINGLE
S703	ON (H)	OFF (L)	OFF (L)
S704	OFF (L)	ON (H)	OFF (L)

The underlined indicates the switch position.

——— Focus servo loop line
- - - - - - - Signal route
——— Tracking servo loop line
- - - - - - - Carriage servo line
——— Loading motor route
- - - - - - - Spindle motor route
- - - - - - - Disc select motor route
► Measurement point

6.2 SCHEMATIC DIAGRAM




IC1 DECODER
IC8 (1/2): VCO CONTROL
IC1(1/2): FOCUS DRIVE
IC8(1/2): SPINDLE CONTROL
IC1(2/2): SPINDLE DRIVE
MECHANISM SECTION
SPINDLE MOTOR
FORWARD DIRECTION
PXM-147
IC32: SYSTEM RESET
IC3(1/2): CARRIAGE DRIVE
CARRIAGE MOTOR
FORWARD DIRECTION
PYY-504
SELECT BOARD ASSEMBLY (1/2)
Q601 GP1A01
S601: PSH-006
SWITCH BOARD ASSEMBLY
S701~704 PSH-006
S101 INSIDE PSH-007
Q9,10: INTER-FACE
IC12 SYSTEM CONTROL
IC10 RAM
IC15 D/A CONVERTER
TTL-ECL INTERFACE CIRCUIT
TIMING GENERATOR CIRCUIT
UPPER 8 BIT SHIFT REGISTER, LATCH, COUNTER
LOWER 8 BIT SHIFT REGISTER, LATCH, COUNTER
IC20~23: REGULATOR
IC24,25: PROTECTOR
Q25: REGULATOR
Q21,22: LINE MUTING
TRANSFORMER BOARD ASSEMBLY
POWER SWITCH BOARD ASSEMBLY
S401 POWER SW PSA-009
C401: PCG-009 (VCG-004)
AC 220V/240V 50/60Hz
AC POWER CORD PDG1008
AUDIO BOARD ASSEMBLY
IC201 Q201,Q203 Q205~Q209 D214
D211
V201
Q207
FOR HEM TYPE
Line Voltage Selection
Line Voltage can be changed with following steps.
1. Disconnect the AC power cord.
2. Remove the top cover.
3. Change the connection of the transformer board assembly Jumper wire.
4. Stick the line voltage label on the rear panel.
Part No. Description
AAX-192 220V label
AAX-192 240V label
IC1 AN78L12 AN78N05F AN79L12 AN79N05F BA6109
IC2,IC3 Q22 Q23 Q21 D6 D4 D3,D24 D23 D13-D22 D27,D28,D41-D43
TA7256P DTC124ES 2SA1048 (2SA1015) 2SA933S KV1226YBR (KV1226YBR) MTZ11C MTZ5.1B (NTZ5.1C) RD27EB2 (RD27EB3) S5566B 1SS254
VL1 L4-L6 C129,C130 C127,C128 VR3,VR4 VR5 VR2,VR6 R112 R101 R111 R113 X3 X2 X1
PTL-031 LRA010K PCH1042 PCH1036 VRTB6VS103 VRTB6VS104 VRTB6VS473 R4AS103J R4AS473J RA7S103J RA8S103J KBR-008H VSS-018 PSS-012
IC19 IC15 IC17,IC18 Q12 Q17,Q18 Q13,14 D7,D8,D25,D26 F1,F2 L1 C82,C84 C81 C83 X4
BU4053B CX20162 M5238BF 2SA933SLN (2SA933LN) 2SD1302 2SK505 HZ6A1L (HZ6A2L) PTF-008 LRA010K PCL-065 PCL1001 VCF-005 PSS-008
IC21 IC23 IC20 IC22 IC4,IC27 IC10 IC6 IC5 IC9 IC24,IC25 IC32 IC8 IC11 IC12
CXK5816M-12L (CXK5816M-15L) CX20108 CX20109 CX23035 ICP-F15 M51957AL M5238LF PDE003 PD3079

NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.

IC21	AN78L12	IC2,IC3	TA7256P	VL1	PTL-031
IC23	AN78M05F			L4-L6	LRA010K
IC20	AN79L12	Q22	DTC124ES	C129,C130	PCH1042
IC22	AN79M05F	Q23	2SA1048 (2SA1015)	C127,C128	PCH1036
IC4,IC27	BA6109	Q21	2SA933S	VR3,VR4	VRTB6VS103
IC10	CXK5816M-12L (CXK5816M-15L)	D6	KV1225YBR (KV1226YBR)	VR5	VRTB6VS104
IC6	CX20108	D4	MTZ11C	VR2,VR6	VRTB6VS473
IC5	CX20109	D3,D24	MTZ5.1B (MTZ5.1C)	R112	RA4S103J
IC9	CX23035	D23	RD27EB2 (RD27EB3)	R101	RA4S473J
IC24,IC25	ICP-F15	D13-D22	S5566B	R111	RA7S103J
IC32	M51957AL	D27,D28,D41-D43	1SS254	R113	RA8S103J
IC8	M5238LF			X3	KBR-008H
IC11	PDE003			X2	VSS-018
IC12	PD3079			X1	PSS-012

AUDIO BOARD ASSEMBLY

IC19	BU4053B
IC15	CX20152
IC17,IC18	M5238FP
Q12	2SA933S LN (2SA933LN)
Q17,Q18	2SD1302
Q13,14	2SK505
D7,D8,D25,D26	HZS A1L (HZ6A2L)
F1,F2	PTF-008
L1	LRA010K
C82,C84	PCL-055
C81	PCL1001
C83	VCF-005
X4	PSS-008

FOR HEM TYPE

Line Voltage Selection
Line Voltage can be changed with following steps.
1. Disconnect the AC power cord.
2. Remove the top cover.
3. Change the connection of the transformer board assembly Jumper wire.
4. Stick the line voltage label on the rear panel.

Part No.	Description
AAX-192	220V label
AAX-192	240V label

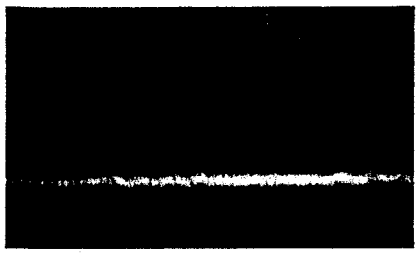
6.3 LIST OF SYMBOLS

Symbol	Signal Source	Signal Name	Function
A			Tracking signal lead code detector
A0~A10	IC9-38~48	Address line	
APCG	IC1-6	APC GND	
B1~B4			Output from 1/4 divider detectors used to detect RF and focus signals
BCLK	IC9-76	Bit clock	
C			Tracking signal end code detector
C·OUT	IC6-6	Counter out	Track count signal pulse
C1F1	IC9-62	Error flag	Flags indicating when decoder LSI is correcting errors
C1F2	IC9-63	Error flag	
C2F1	IC9-64	Error flag	
C2F2	IC9-65	Error flag	
CA·DR	IC3-2	Carriage drive	Carriage motor drive output
CLK	IC12-27	Clock	IC6 and IC9 control data (serial) clock
CRCF	IC9-20		Sub-code Q error detection result output (synchronized with SCOR signal)
$\overline{CS}$	IC9-50	Chip select	RAM activator control signal
D1~D8	IC9-37~34 32~29	Data line	RAM data line
DATA	IC9-78	Data	DAC playback signal data (serial)
$\overline{DEMP}$	IC12-53	De-emphasis	De-emphasis on/off signal (L: de-emphasis ON)
DIRC	IC12-52	Direct	Control signal involved in single track jumping (control only while signal is at L level)
EXCK	IC9-21	External clock	External clock input
FO·DR	IC2-2	Focus drive	Focus actuator drive signal
FO·ER	IC5-16	Focus error	Focus error signal
FO·IN	CN101-6	Focus loop in	Focus servo gain adjustment input
FO·OT	CN101-1	Focus loop out	Focus servo gain adjustment output
FO·RT	CN101-8	Focus return	Focus actuator drive current detector
FOK	IC5-1	Focus OK	H level output to indicate that "in focus" status is set when RF signal is obtained
GFS	IC9-28	GFS	Frame sync lock status output (H: locked)
GND		GND	
$\overline{INSD}$	S101	Inside	Detector signal indicating that pick-up has reached inside track
K			
KD0~KD5	IC11 9~12 15, 17	Key data	Key on/off matrix encoded data
$\overline{KS}$	IC201-11	Key strobe	Output indicating that key has been pressed (L output when key is ON)
L·IN	IC12-44	Loading in	Loading-in control signal
L·OUT	IC12-45	Loading out	Loading-out control signal
LD ON	IC12-56	Laser diode on	Laser diode switching signal (H: diode ON)
LOAD +	IC4-10		Loading motor drive voltage output
LOAD −	IC4-2		
LRCK	IC9-80	LR clock	Clock for switching decoder (DAC) left/right channels

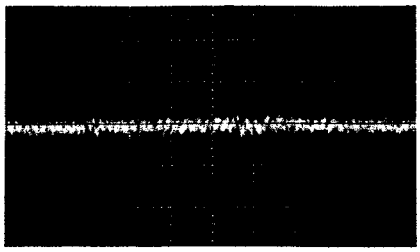
Symbol	Signal Source	Signal Name	Function
MIRR	IC5-18	Mirror	Pitless side (mirror surface) detector signal (pitless side: H)
MRIH	IC12-55	Mirror inhibit	Control signal which inhibits transfer of MIRR signal from IC5 to IC9
MUTE	IC12-16	Muting	IC9 digital mute control signal
RAOV	IC9-57	RAM overflow	Output signal generated when RAM area overflow occurs (overflow: H)
$\overline{\text{RESET}}$	IC32-5	Reset	Power ON reset signal
RFCK	TP4-7(IC9, 25)	Read frame clock	Standard frame clock signal (7.35kHz)
SBSO	IC9-22		Sub-code serial output
SCK	IC12-41	Serial clock	FL display data transfer clock
SCLK	IC9-53	System clock	Audio playback system clock
SCOR	IC9-24		Sub-code sync
SD	IC12-42	Serial data	Control signal passed to FL control CPU
SENS	IC6-5		Detector output bus from IC6 & IC9
SP·DR	CN4-5	Spindle drive	Spindle motor drive output
SP·RT	CN4-6	Spindle return	Spindle motor drive current detector
SRES	IC12-23	Sub reset	Key/display/microprocessor reset signal
STS	IC201-12	Status	Display data "ready to send"
SUBQ	IC9-23	Sub-code Q	Sub-code Q output (address and other data)
TR·DR	IC2-8	Tracking drive	Tracking actuator drive signal
TR·ER	IC5-17	Tracking error	Tracking servo error output
TR·IN	CN101-7	Tracking loop in	Tracking servo gain adjustment input
TR·OT	CN101-2	Tracking loop out	Tracking servo gain adjustment output
TR·RT	CN101-9	Tracking return	Tracking actuator drive current detector
WCLK	IC9-79		88.2kHz strobe signal input
WDCK	IC9-79		88.2kHz strobe signal output
$\overline{\text{WE}}$	IC9-49	Write enable	RAM write enable
WFCK	IC9-25	Write from clock	Frame clock signal made from data (frame sync. lock: 7.35kHz)
$\overline{\text{XLT}}$	IC12-14		Servo and decode IC serial data latch clock pulse signal
DCNT	IC12-24	DISC COUNT	Count pulse input to detect DISC SELECT
DCHM	IC12-26	DISC HOME	DISC SELECT home position detection SW input
LPS1	IC12-28	Loading position	Loading position detection SW input
LPS2	IC12-29	Loading position	Loading position detection SW input
MZS1	IC12-30	MAGAZINE DC-TEG	Magazine and its kind detection SW input
MZS2	IC12-31	MAGAZINE DC-TEG	Magazine and its kind detection SW input
DSUP	IC12-46	DISC SELECT UP	DISC SELECT motor drive output
DSDW	IC12-47	DISC SELECT DOWN	DISC SELECT motor drive output

6.4 WAVE FORMS

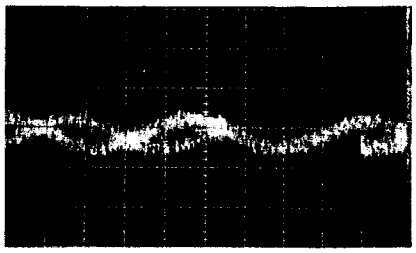
① CN102-2 MODE: PLAY
V: 200mV/div H: 2m sec/div



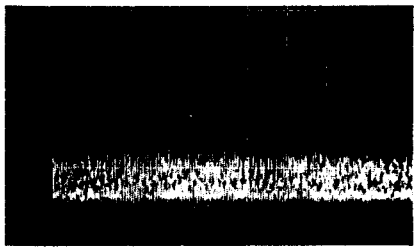
③ CN101-3 MODE: SEARCH
V: 500mV/div H: 5m sec/div



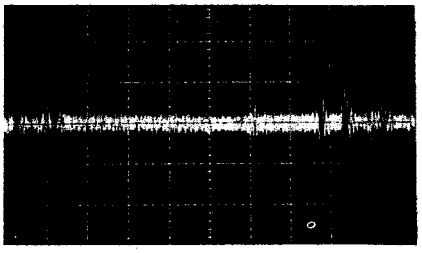
⑥ CN101-9 MODE: PLAY
V: 500mV/div H: 10m sec/div



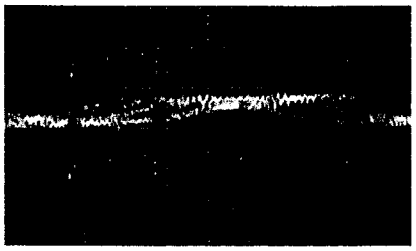
① CN102-2 MODE: SEARCH
V: 200mV/div H:2m sec/div



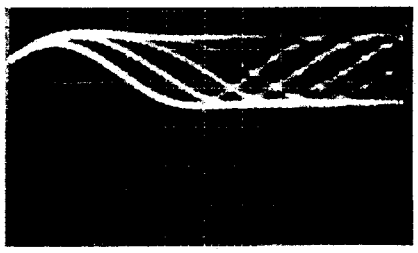
④ CN101-4 MODE: PLAY
V: 2V/div H: 20m sec/div



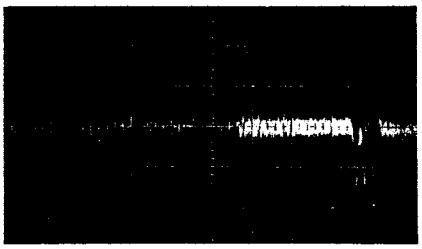
⑥ CN101-9 MODE: SEARCH
V: 500mV/div H: 10m sec/div



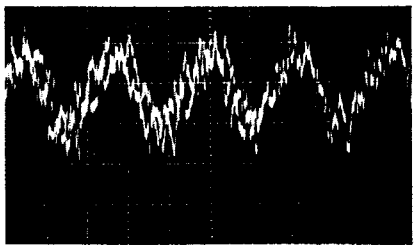
② CN105-1 MODE: PLAY
V: 1V/div H: 200n sec/div



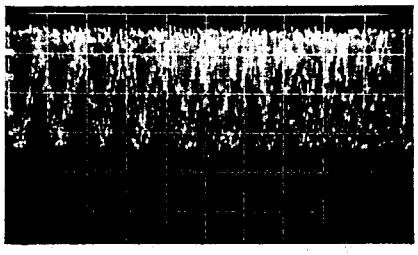
④ CN101-4 MODE: SEARCH
V: 2V/div H: 20m sec/div



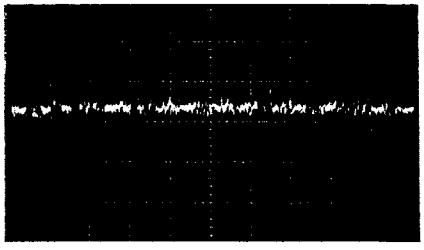
⑦ IC8-1 MODE: PLAY
V: 200mV/div H: 50m sec/div



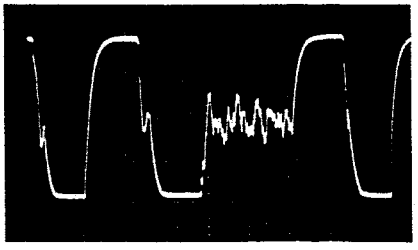
② CN105-1 MODE: SEARCH
V: 500mV/div H: 100μsec/div



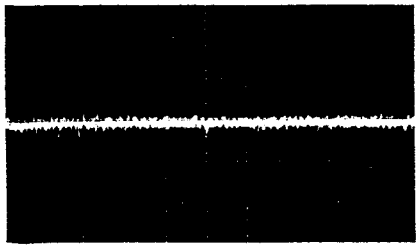
⑤ CN101-8 MODE: PLAY
V: 500mV/div H: 10m sec/div



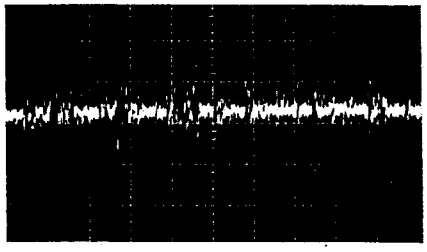
⑦ IC8-1 MODE : SEARCH
V: 2V/div H: 200m sec/div



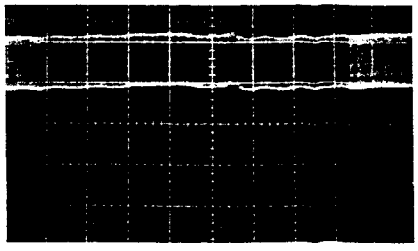
③ CN101-3 MODE: PLAY
V: 500mV/div H: 5m sec/div



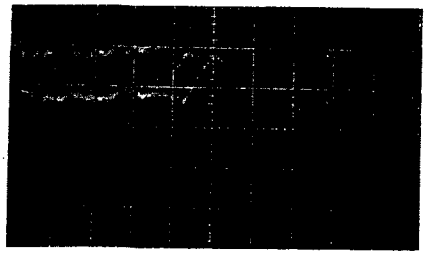
⑤ CN101-8 MODE: SEARCH
V: 500mV/div H: 10m sec/div



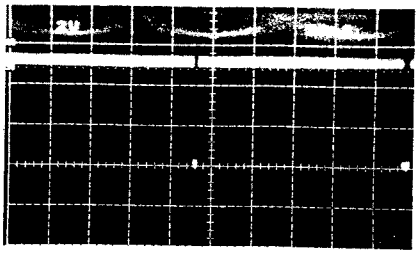
⑧ IC8-7 MODE: PLAY
V: 500mV/div H: 20m sec/div



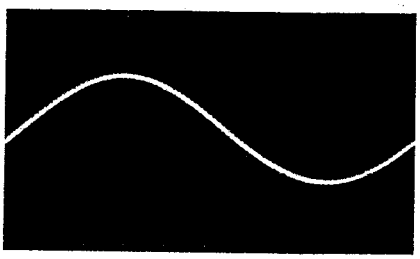
⑧ IC8-7 MODE: SEARCH
V: 500mV/div H: 20m sec/div



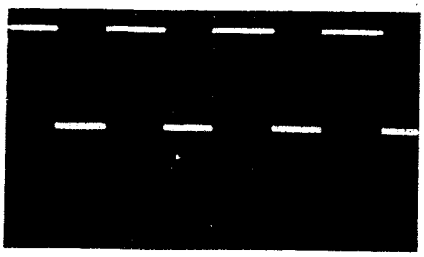
⑪ TP4-1 MODE : PLAY
V: 2V/div H: 200μsec/div



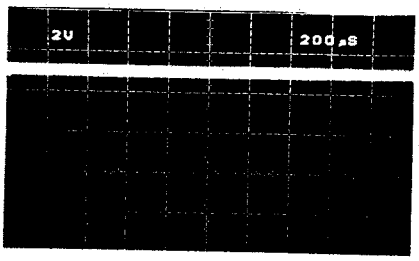
⑭ IC17-7 MODE : PLAY
V: 2V/div H: 100μsec/div



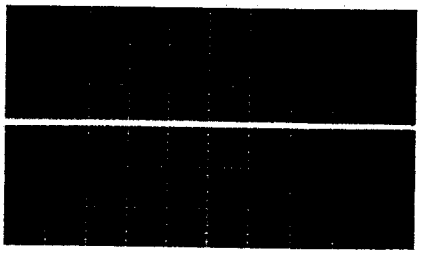
⑨ IC9-4 MODE : PLAY
V: 2V/div H: 50μsec/div



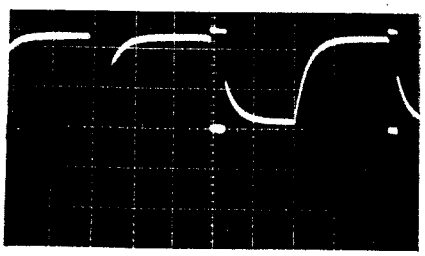
⑪ TP4-1 MODE : SEARCH
V: 2V/div H: 20m sec/div



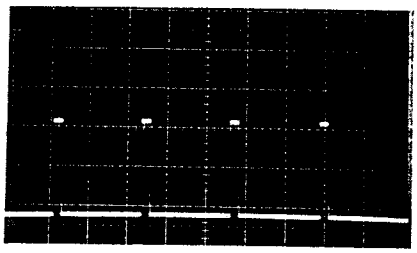
⑭ IC17-7 MODE : SEARCH
V: 2V/div H: 100μsec/div



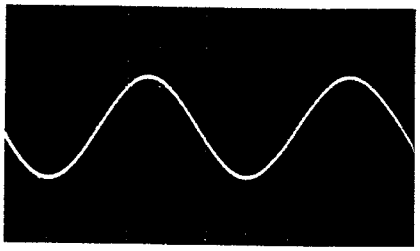
⑨ IC9-4 MODE : SEARCH
V: 2V/div H:100m sec/div



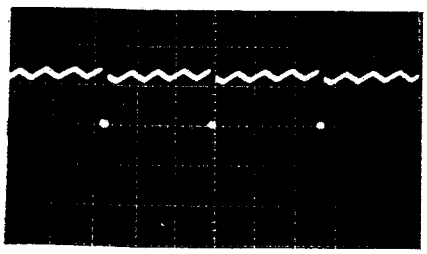
⑫ IC15-23 MODE : PLAY or SEARCH
V: 2V/div H: 5μsec/div



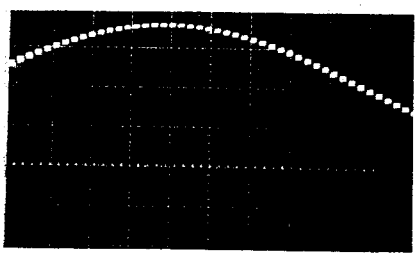
⑮ OUT L MODE : PLAY
V: 2V/div H: 200μsec/div



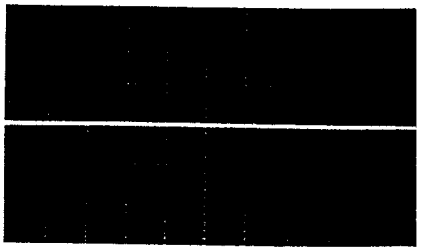
⑩ IC9-3 MODE : PLAY
V: 2V/div H: 200μsec/div



⑬ IC17-1 MODE : PLAY
V: 2V/div H: 50μsec/div

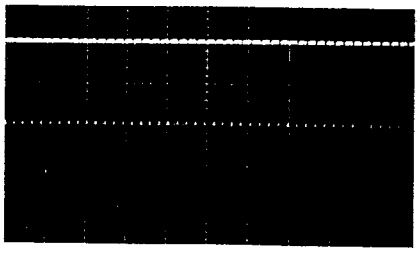


⑮ OUT L MODE : SEARCH
V: 2V/div H: 200μsec/div

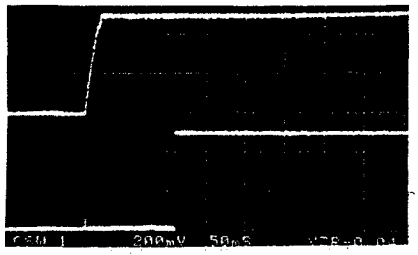


⑩ IC9-3 MODE : SEARCH
V: 2V/div H: 10m sec/div

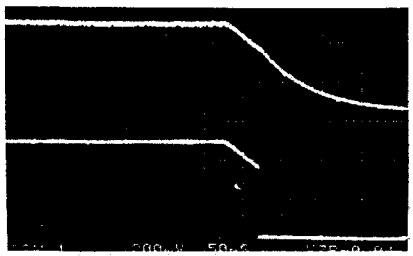
⑬ IC17-1 MODE : SEARCH
V: 2V/div H: 50μsec/div



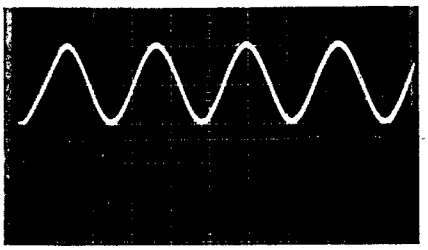
(17) IC32-5 POWER ON
V: 2V/div H: 50 msec/div



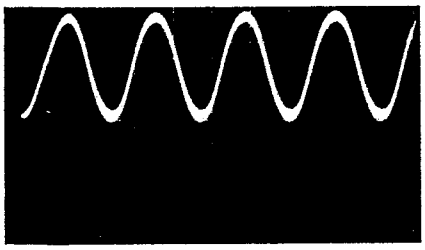
(17) IC32-5 POWER OFF
V: 2V/div H: 50 msec/div



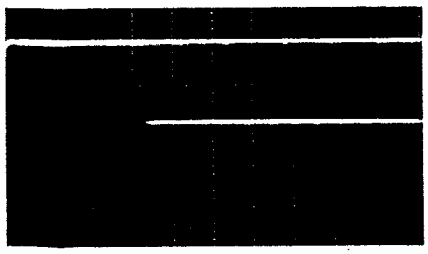
(18) IC9-9 MODE : STOP
V: 2V/div H: 50m sec/div



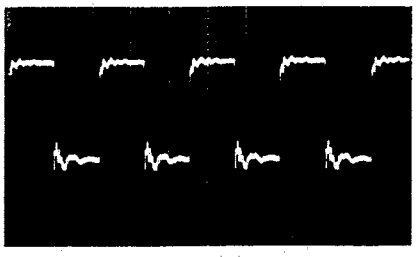
(19) IC9-8 MODE : STOP
V: 1V/div H: 50m sec/div



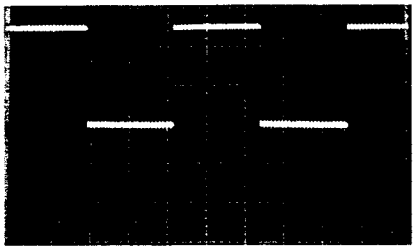
(20) IC9-5 MODE : PLAY
V: 2V/div H: 200 sec/div



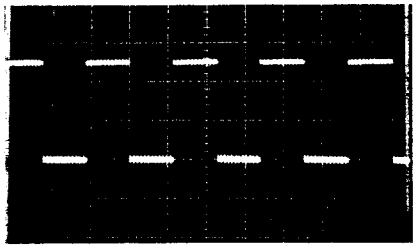
(21) IC9-76 MODE : STOP
V: 2V/div H: 200m sec/div



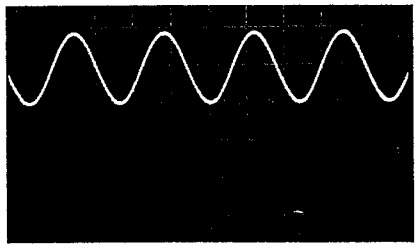
(22) IC9-80 MODE : STOP
V: 2V/div H: 5μsec/div



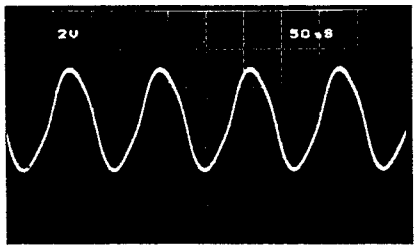
(23) IC9-79 MODE : STOP
V: 2V/div H: 5μsec/div



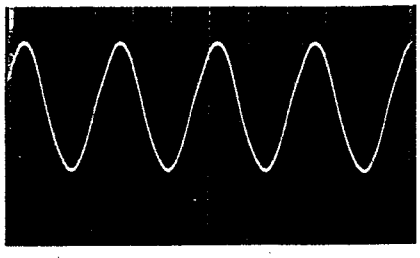
(24) IC9-53 MODE : STOP
V: 2V/div H: 50n sec/div



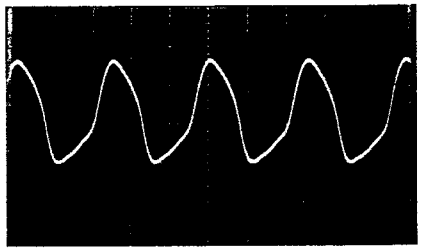
(25) IC9-54 MODE : STOP
V: 2V/div H: 50n sec/div



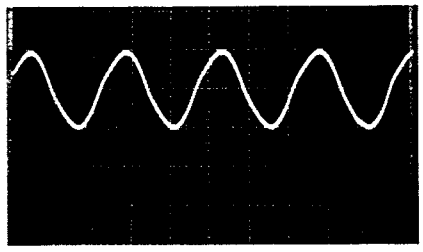
(26) IC11-5 MODE : STOP
V: 2V/div H: 500n sec/div



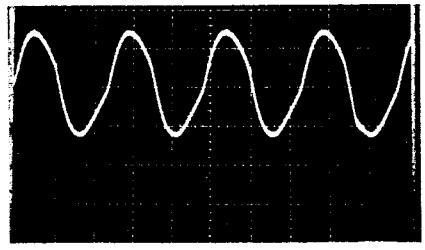
(27) IC11-6 MODE : STOP
V: 2V/div H: 500n sec/div



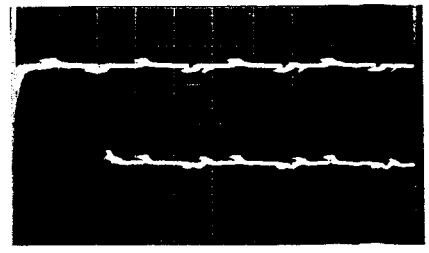
(28) IC12-6 MODE : STOP
V: 2V/div H: 100n sec/div



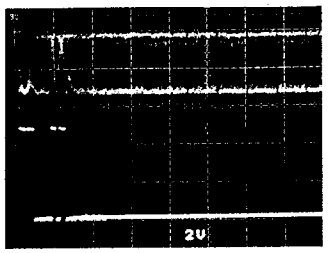
(29) IC12-5 MODE : STOP
V: 2V/div H: 100n sec/div



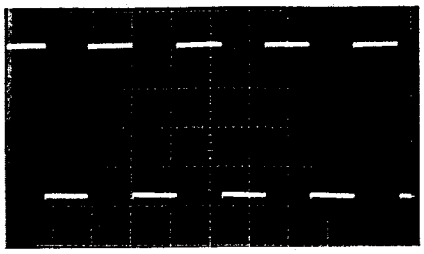
(30) IC15-10 MODE : PLAY
V: 2V/div H: 200n sec/div



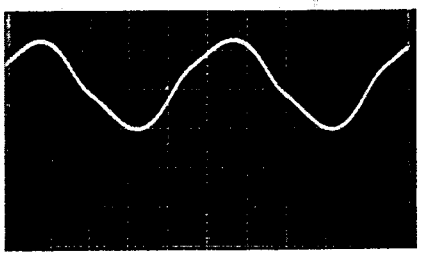
(31) C5-18 MODE : PLAY
V : 2V/div H : 200n sec/div



(33) IC15-11 MODE : STOP
V : 2V/div H : 5μsec/div



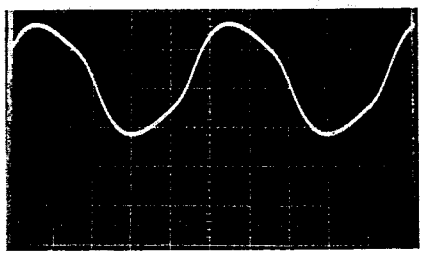
(35) IC201-2 MODE : STOP
V : 2V/div H : 500n sec/div



(32)

(34)

(36) IC201-3 MODE : STOP
V : 2V/div H : 500n sec/div



7. ADJUSTMENT

• Adjustment Items

1. LD (Laser Diode) output power verification
2. Tracking offset and focus offset adjustments
3. Focus lock and spindle lock verification
4. Grating adjustment
5. Tracking balance adjustment
6. Tangential adjustment
7. Focus gain adjustment
8. Tracking gain adjustment
9. VCO free-run frequency adjustment

• Measuring Equipment

1. Dual trace oscilloscope
2. Laser power meter (LPM-8000)
3. Test disc (YEDS-7)
4. AF oscillator
5. Grating driver (R-882)

• Test Mode

All the adjustments should be performed in Test Mode.

Test Mode setting and cancellation procedures

(1)To set the Test Mode, turn the Power switch of the player (S401) ON shorting the TEST MODE TERMINALs.
(2)To cancel the Test Mode, simply turn the POWER switch of the player OFF.

The various key functions in the Test Mode are listed in Table 7-1.

• Adjusting points

VR2: Tracking offset (TR.OF)
VR3: Focus gain (FO.GA)
VR4: Tracking gain (TR.GA)
VR5: Tracking Balance (TR.BL)
VR6: Focus offset (FO.OF)
VL1: VCO free-run frequency

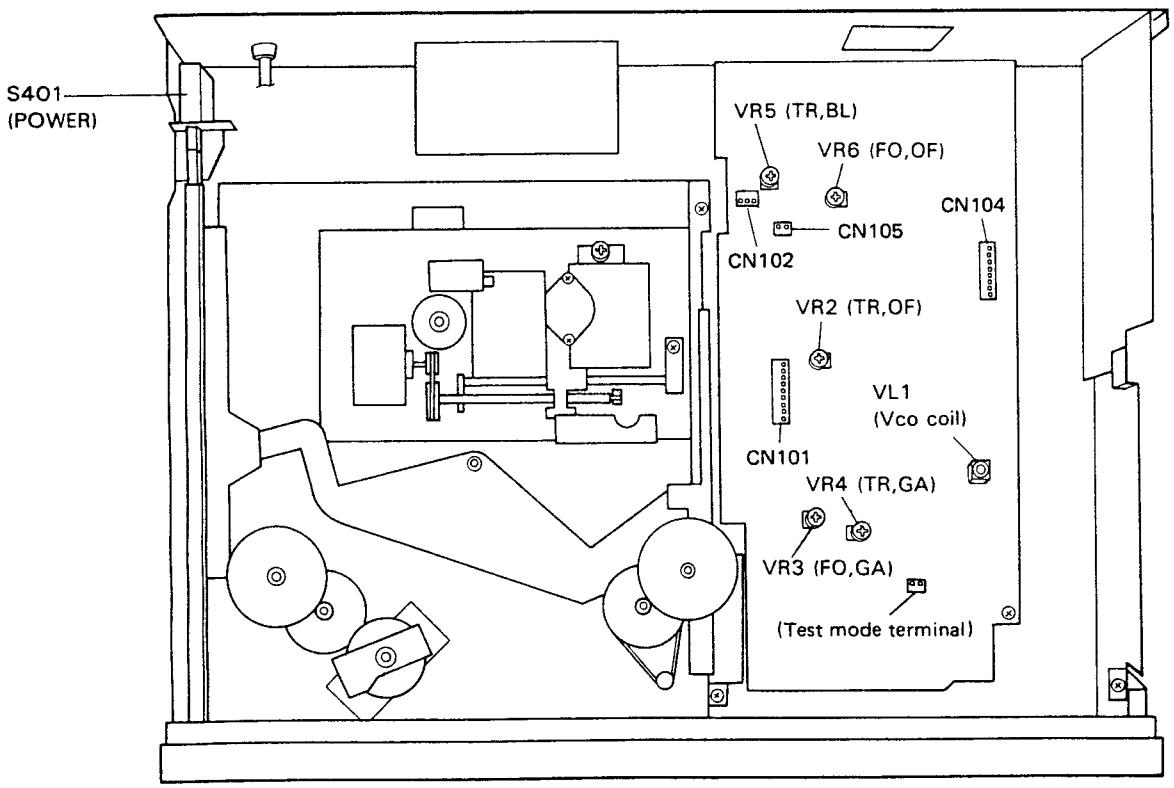
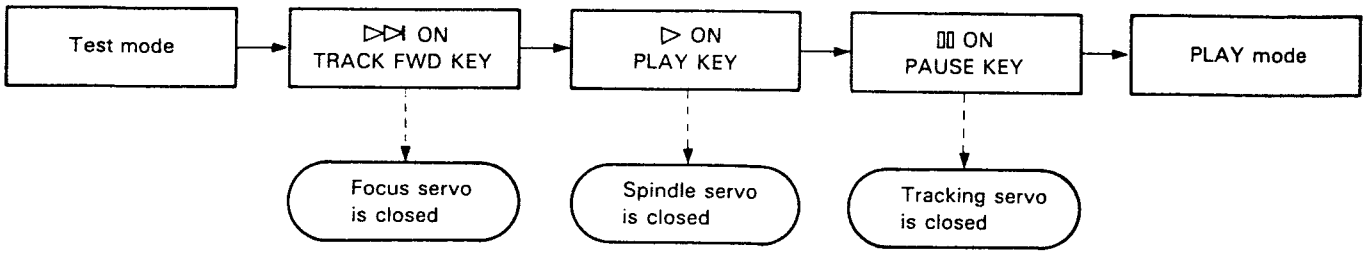


Fig. 7-1 Adjustment Points

In the Test Mode, each servo circuit can be closed and opened by separate operations. Consequently, each servo must be closed one at a time (in serial sequence) to set PLAY mode.

Note that PLAY mode is not activated by simply pressing the PLAY key in the Test Mode.
While a disc is being selected or loaded, do not try to perform other operations.

Example: Switching from STOP to PLAY mode.



- The servo mechanisms operate in a serial sequence in the Test Mode.

• Key Functions in Test Mode

Symbol	Key	Function during test mode	Description
⏮	TRACK BACK	Laser diode turned ON.	Laser diode lights up.
⏭	TRACK FWD	Focus servo is closed.	Disc is loaded from magazine and clamped. Laser diode lights up. Actuator is moved up/down, then focus servo is closed.
▷	PLAY	Spindle servo is closed.	Spindle starts to rotate and the servo is closed when the revolution reaches the optimum speed.
▯▯	PAUSE	Tracking servo is closed/opened.	Tracking servo is closed by pressing the key once, PAUSE indicator lights up and the player is switched to PLAY mode with the elapsed time indicated on fluorescent display. Focus and spindle servos must be closed at this time. When the key is pressed again, tracking servo is opened.
◁◁	MANUAL SEARCH REV	Carriage moves reverse direction. (towards disc center)	Carriage is moved towards disc center at a fast speed of about 1cm/sec. Since there is no safety mechanism to stop the carriage, release the key when the carriage reaches the end.
▷▷	MANUAL SEARCH FWD	Carriage moves forward direction. (towards disc end)	Carriage is moved towards disc end at a fast speed of about 1cm/sec. Since there is no safety mechanism to stop the carriage, release the key when the carriage reaches the end.
▭	REPEAT	Lens is moved up/down.	Disc is loaded from magazine and clamped. Laser diode lights up. Actuator is moved up and down twice, then the disc is returned into magazine. Focus servo is not closed.
□	STOP	STOP	All servos are opened.
⏏	EJECT	Magazine is ejected.	Magazine is ejected. However, pickup does not return to the park position.
1-6	DISC 1-6 KEY	Disc is selected.	A disc can be selected in the six-disc system. If TRACK FWD key or REPEAT key is pressed without selecting a disc, the player automatically selects the first disc.

Table 7-1

NOTE:
1) The following adjustment should be performed in the Test Mode.
   Refer to page 35 to set the player in Test Mode.
2) The following adjustment except [1. LD OUTPUT POWER VERIFICATION] should be performed with a Test Disc (YEDS-7).
   Place the Test Disc recorded side up in a magazine and load the magazine in the player.
3) The description of the following adjustments starts from "STOP".

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
1	**LD (LASER DIODE) OUTPUT POWER VERIFICATION** *NOTE:* *This item can be skipped under normal service. It should be verified only when the laser power seems to be weak or the laser diode seems to be defective.*					
				VR1	0.26mW ± 0.02mW	To verify the laser output power, the pickup has to be removed from Mechanism Chassis in the following procedure. • Turn power switch off. • Unbelt belt A. • Remove guide bar retainer. • Unhook drive screw. • Slowly lift pickup assembly upside down keeping flat cable connected. Be careful not to short the P.C. board on the pickup to chassis. • Set the player to test mode. • Place the sensor of Laser Power Meter (LPM-8000) above the objective lens. • Press TRACK REV key to turn the laser on. • Verify that the laser output power is within the specified range (0.26 ± 0.02mW). If not, adjust VR1 on the pickup to satisfy the specification. • Turn power switch off. • Reassemble the parts.
2	**TRACKING OFFSET AND FOCUS OFFSET ADJUSTMENT**					
	20mV /div	1mS /div	CN101 pin9 (TR.RT)	VR2 (TR.OF)	0V ± 10mV	• Connect Oscilloscope or Volt meter to CN101 pin9 TR.RT (Tracking Return). Adjust VR2 TR.OF (Tracking Offset) so that the voltage at CN101 pin9 becomes 0V ± 10mV.
	20mV /div	1mS /div	CN101 pin3 (FO.ER)	VR6 (FO.OF)	0V ± 10mV	• Connect Oscilloscope or Volt meter to CN101 pin3 FO.ER (Focus Error). Adjust VR6 FO.OF (Focus Offset) so that the voltage at CN101 pin3 becomes 0V ± 10mV.

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
3	**FOCUS LOCK AND SPINDLE LOCK VERIFICATION**					
	0.2V /div	10μS /div	CN105 pin1 (RF)		RF signal is generated	• Press MANUAL SEARCH FWD key to move the pick-up close to the midway of the disc. Note that this step must be performed. • Connect Oscilloscope to CN105 pin1 RF (RF output) and verify that an RF signal is generated when the TRACK FWD key is pressed (when the focus servo is closed).
					Counterclockwise rotation	• Press PLAY key and check that the disc rotates at an optimum speed (about 300rpm on the midway of the disc) in the counterclockwise direction.
4	**GRATING ADJUSTMENT**					
	1V /div	10mS /div	CN101 pin4 (TR.ER)	Grating	NULL point (Small and smooth envelope)	• Press TRACK FWD key and PLAY key by turns to close the focus and spindle servos (leaving the tracking servo open). • Connect Oscilloscope to CN101 pin4 TR.ER (tracking error) through a 4kHz L.P.F. as shown in Fig. 7-2. • Insert grating driver into the adjusting hole of the pick-up as shown in Fig. 7-3. Slowly turn it and find the NULL point. (see photograph 7-1) Note: If the pickup is raised by the grating driver during the adjustment, hold the pickup down slightly.
					Maximum amplitude	• Turn the grating driver clockwise slowly from the NULL point and stop it at the point where the tracking error signal waveform first reaches the maximum. (see photograph 7-3)
	CH-1 50mV /div	X-Y mode	CH-1 CN102 pin1 (BKTE)			• Connect Oscilloscope CH-1 to CN102 pin1 (BKTE) and CH-2 to CN102 pin2 (FWTE). Set AC-GND-DC switch of Oscilloscope to AC and mode to X-Y.
	CH-2 50mV /div AC-coupling		CH-2 CN102 pin2 (FWTE)		Straight line of 45 degrees	• While observing the Lissajous figure (see photograph 7-4), finely adjust the grating to the point where the Lissajous becomes a slender line in 45 degrees. (see photograph 7-5).

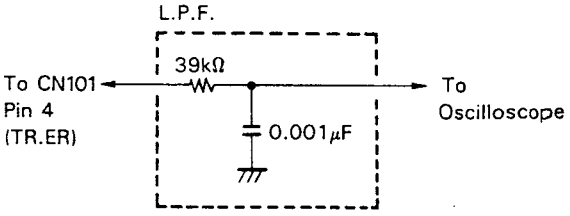


Fig. 7-2 4KHz L.P.F.

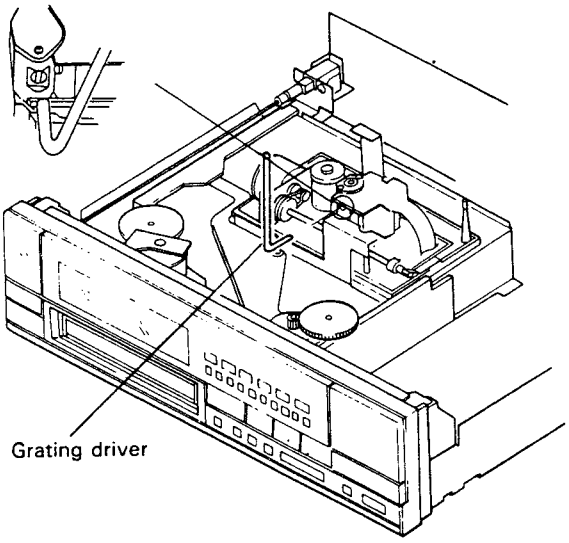
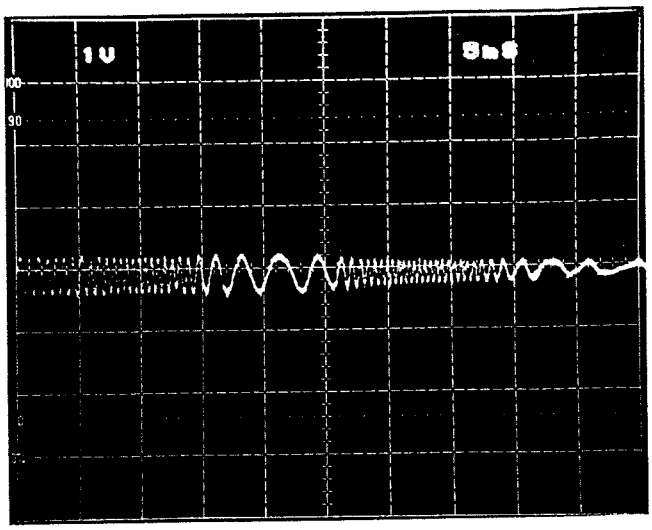
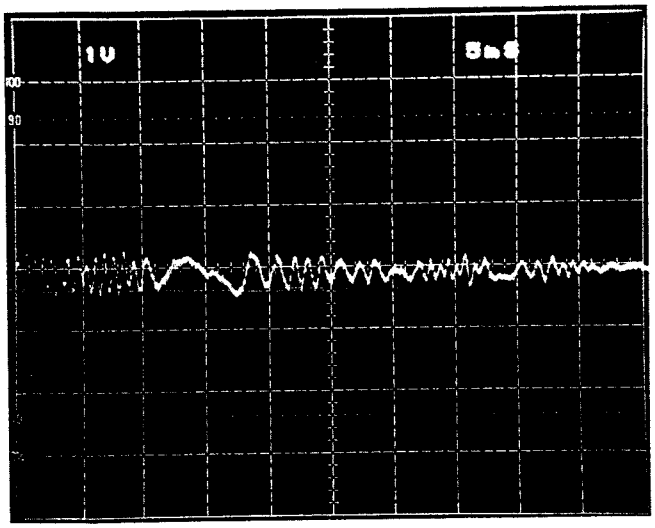


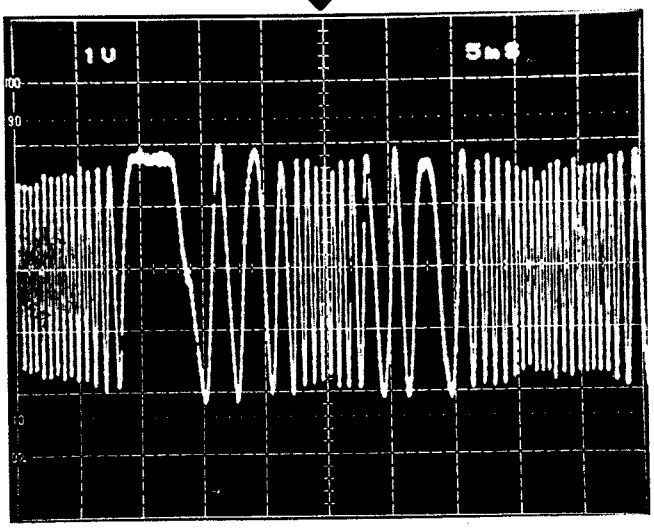
Fig. 7-3 Grating adjustment



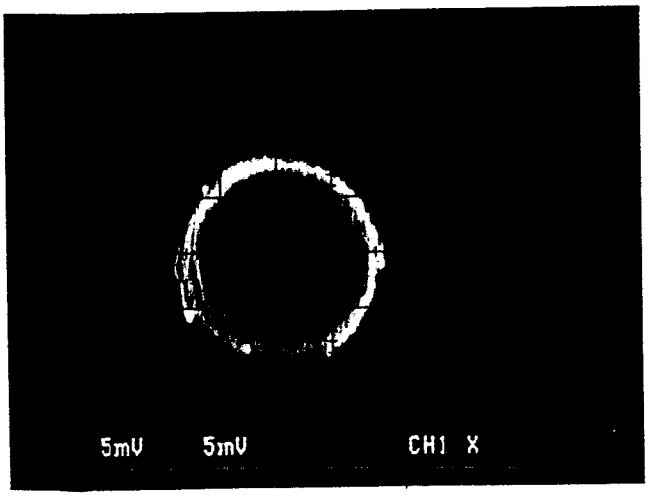
Photograph 7-1
Small and smooth envelope (NULL point)



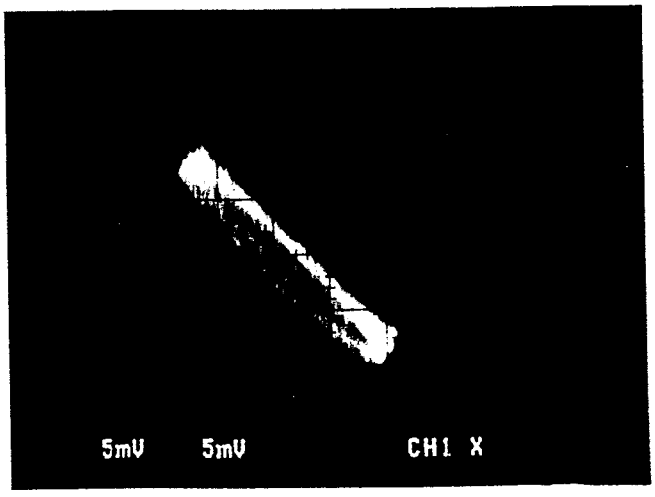
Photograph 7-2
Small but rough envelope (not NULL point)



Photograph 7-3
Maximum amplitude

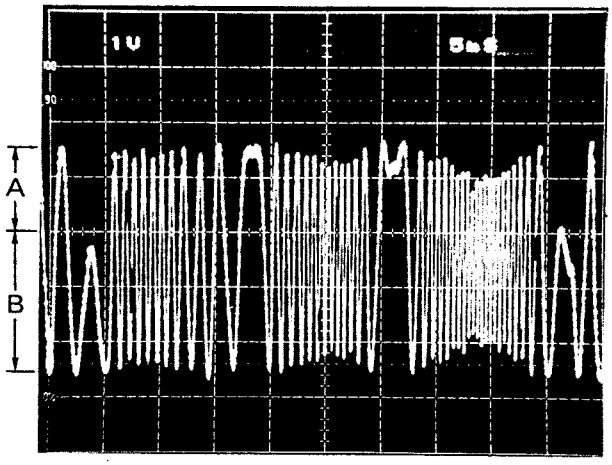


Photograph 7-4
Lissajous figures (before adjustment)

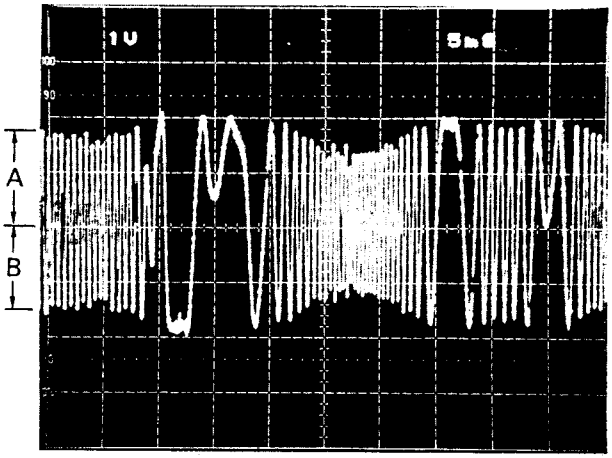


Photograph 7-5
Lissajous figures (after adjustment)

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
5	**TRACKING BALANCE ADJUSTMENT**					
	1V /div	10mS /div	CN101 pin4 (TR.ER)	VR 5 (TR.BL)	Equal positive & negative amplitude (A = B)	• Press MANUAL SEARCH FWD key to move the pick-up close to the midway of the disc. • Press TRACK FWD key and PLAY key by turns to start turning the disc. • Set GND level of Oscilloscope at the center. • Connect Oscilloscope to CN101 pin4 TR.ER (Tracking) Error) through a L.P.F. shown in Fig. 7-2. Adjust VR5 TR.BL (Tracking Balance) so that the positive and negative amplitude of the waveform become equal as in photograph 7-7.



Photograph 7-6 A<B



Photograph 7-7 A = B

6	**PICKUP ANGLE ADJUSTMENT**					
	0.2V /div AC-coupling	0.2μS /div	CN105 pin1 (RF)	Pickup angle adjustment screw	Best eye pattern	• Press TRACK FWD key, PLAY key and PAUSE key by turns to close all servos. (The PAUSE indicator should be lit up) • Connect oscilloscope to CN105 pin1 RF (RF output) through a 10k-ohm resistor. Use a 5k-ohm resistor instead if the waveform is not clear. • Adjust pickup angle adjustment screw to obtain the clearest eye pattern as in photograph 7-8. The optimum point of the adjustment is in the mid-way between the two points from where the eye pattern starts to deteriorate when the pickup angle adjustment screw is turned clockwise or counter-clockwise.

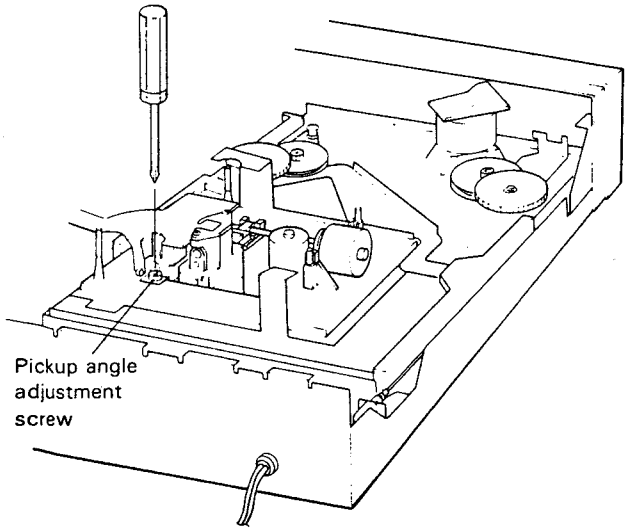
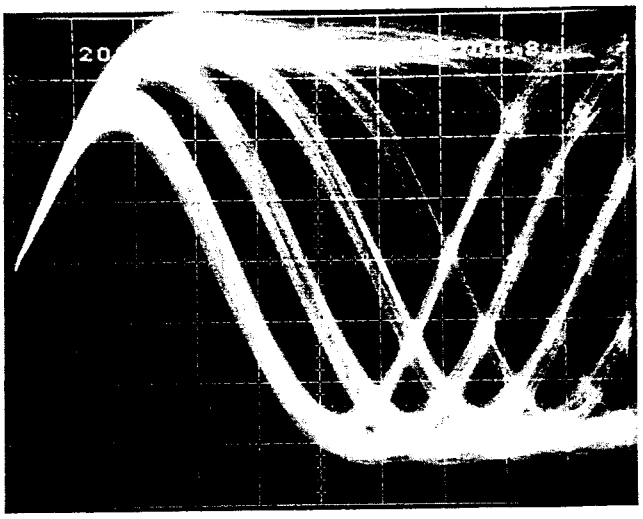
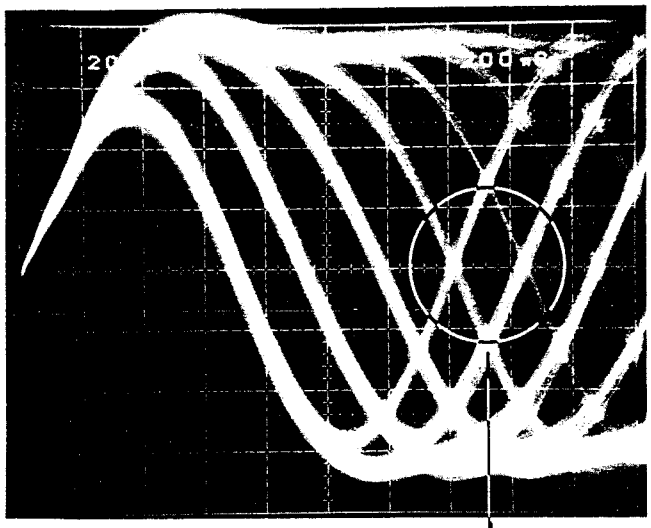
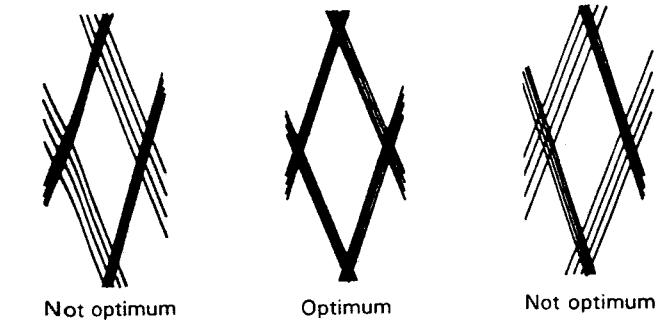


Fig. 7-5 Pickup Angle Adjustment

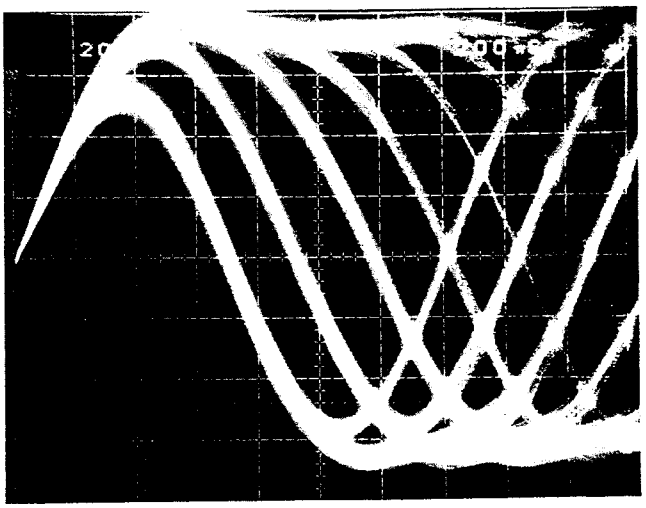


Photograph 7-9

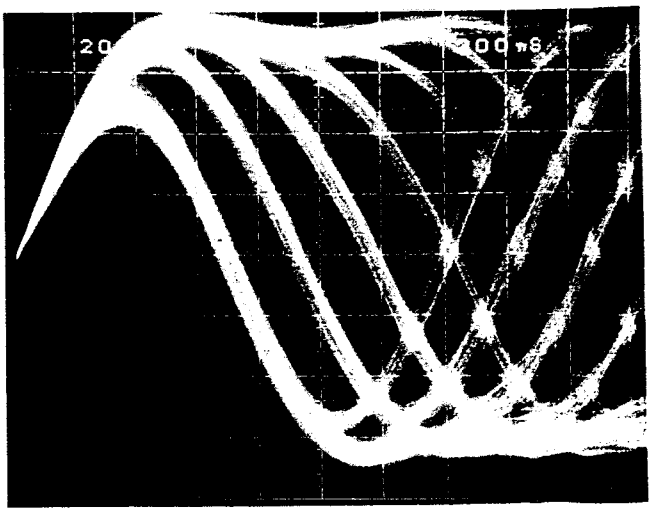




Photograph 7-8



Photograph 7-10



Photograph 7-11

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
7	**FOCUS GAIN ADJUSTMENT (WITHOUT USING AN FTG ADJUSTER)**					
	50mV /div	0.5mS /div	AF Osc. output terminal	AF Osc. output control	880Hz 0.2Vp-p	• Connect Oscilloscope to the output terminal of AF oscillator and adjust its output to 880Hz and 0.2Vp-p. (The AF oscillator output should be adjusted before the connection described below.) • Press TRACK FWD key, PLAY key and PAUSE key by turns to close all servos.
	CH-1 20mV /div CH-2 50mV /div	X-Y mode	CH-1 CN101 pin6 (FO.IN) and AF Osc. output CH-2 CN101 pin1 (FO.OT)	VR3 (FO.GA)	Symmetrical Lissajous figures	• Connect Oscilloscope, AF oscillator and a resistor to the player as shown in Fig. 7-6. Set Oscilloscope to X-Y mode. • Adjust VR3 FO.GA (Focus Gain) so that the Lissajous figures become symmetrical. (see photograph 7-13)

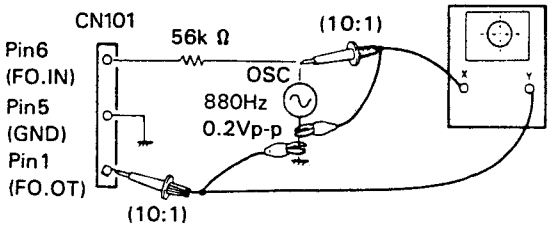
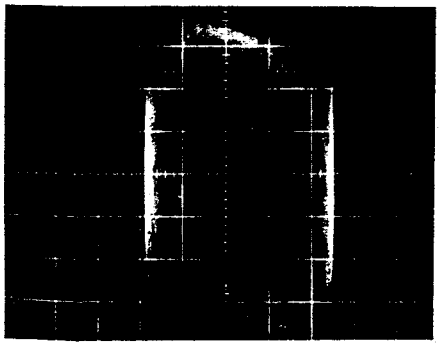
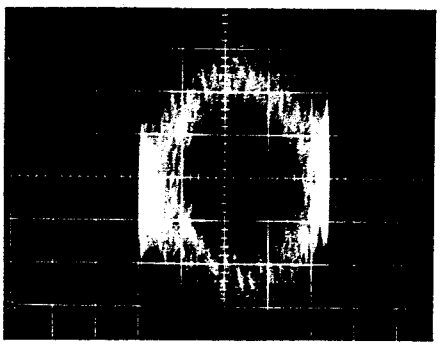


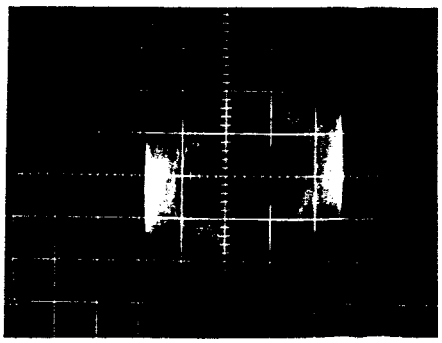
Fig. 7-6



Photograph 7-12
Low gain



Photograph 7-13
Optimum Gain



Photograph 7-14
High gain

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
8	**TRACKING GAIN ADJUSTMENT (WITHOUT USING AN FTG ADJUSTER)**					
	0.1V /div	0.5mS /div	AF Osc. output terminal	AF Osc. output control	1130Hz 0.4Vp-p	• Connect Oscilloscope to the output terminal of AF oscillator and adjust its output to 1130Hz and 0.4Vp-p. (The oscillator output should be adjusted before the connection described below.) • Press the TRACK FWD key, PLAY key and PAUSE key by turns to close all servos.
	CH-1 50mV /div CH-2 50mV /div	X-Y mode	CH-1 CN101 pin7 (TR.IN) and AF Osc. output CH-2 CN101 pin2 (TR.OT)	VR4 (TR.GA)	Symmetrical Lissajous figures	• Connect Oscilloscope, AF oscillator and a resistor to the player as shown in Fig. 7-7. Set Oscilloscope to X-Y mode. • Adjust VR4 TR.GA (Tracking Gain) so that the Lissajous figures become symmetrical (see photograph 7-16).

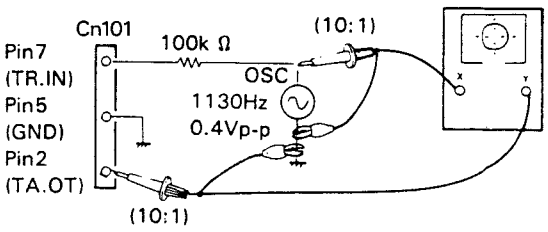
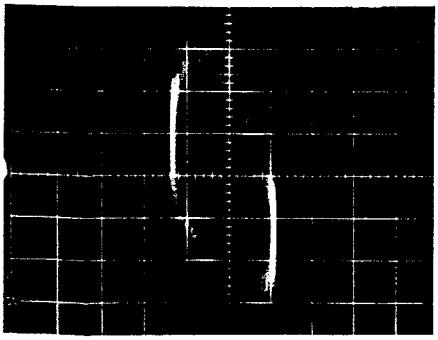
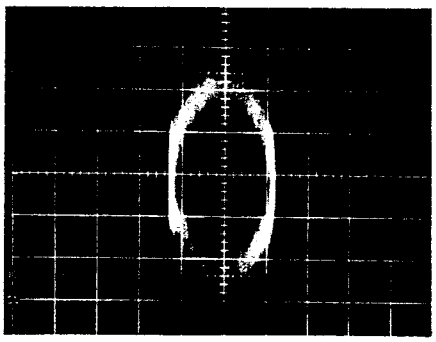


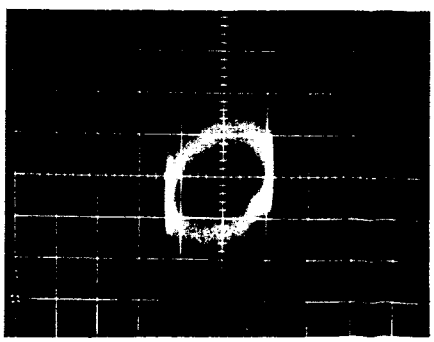
Fig. 7-7



Photograph 7-15
Low gain

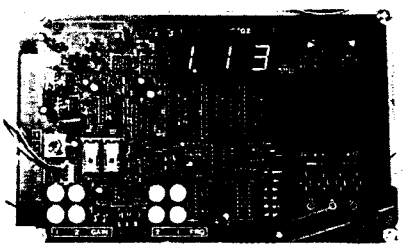


Photograph 7-16
Optimum Gain



Photograph 7-17
High gain

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
9	**FOCUS AND TRACKING GAIN ADJUSTMENT USING AN FTG ADJUSTER**					
						• Turn Power switch of FTG Adjuster on. The Power switch is located on the right side of the adjuster. Turn the Selector switch of the FTG Adjuster to 1. The Selector switch is located on the left side of the panel.
						• Connect Oscilloscope to TP (Test Point) of FTG Adjuster. The TP is located on the right side of Selector switch.
				FREQ-1 Pots of FTG-adjuster		• Adjust two FREQ-1 potentiometers of the FTG Adjuster so that the output frequency becomes 880Hz. The frequency is indicated by three 7-segment LEDs on the FTG Adjuster.
	50mV /div	0.5mS /div	TP of FTG-adjuster	GAIN-1 Pots of FTG-adjuster		• Adjust two GAIN-1 potentiometers of the FTG adjuster so that the amplitude of the output signal becomes 0.2Vp-p.
						• Turn the Selector switch of FTG adjuster to 2.
				FREQ-2 Pots of FTG-adjuster		• Adjust two FREQ-2 potentiometers of the FTG Adjuster so that the output frequency becomes 1130Hz.
	0.1V /div	0.5mS /div	TP of FTG-adjuster	GAIN-2 Pots of FTG-adjuster		• Adjust two GAIN-2 potentiometers of the FTG Adjuster so that the amplitude of the output signal becomes 0.4Vp-p.
						• Turn the Selector switch to the neutral position (center).
						• Connect Orange wire of FTG adjuster to CN101 pin6 (FO.in) of the player, Brown wire to TP1 pin1 (FO.OT), Yellow wire to CN101 pin7 (TR.IN), Red wire to CN101 2 (TR.OT) and Black wire to chassis.
						• Press the TRACK FWD key, PLAY key and PAUSE key by turns to close all servos.
				VR3 (FO.GA)	Green LED (JUST) on	• Turn the Selector switch to 1. Adjust VR3 FO.GA (Focus Gain) so that a green LED (JUST) comes on.
				VR4 (TR.GA)	Green LED (JUST) on	• Turn the Selector switch of FTG Adjuster to 2. Adjust VR4 TR.GA (Tracking Gain) so that the green LED (JUST) comes on.



Photograph 7-18
FTG Adjuster

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
10	VCO FREE-RUN FREQUENCY ADJUSTMENT					
	0.5V /div	0.1μS /div	Lead of pin8 of IC8 (TP6) Main board assembly			• Connect Oscilloscope to the lead of pin8 of IC8 (TP6) of Main board assembly. (see Fig. 7-9)
						• Press TRACK FWD key and PLAY key by turns to close the focus and spindle servos.
						• Turn AC-GND-DC switch of Oscilloscope to DC.
					Waveform is positioned at the center	• Adjust vertical position of Oscilloscope so that the waveform is positioned at the center. Note: It is not necessary to set the GND level at the center of the oscilloscope in this adjustment. Simply position the waveform at the center of the oscilloscope with the vertical position control.
						• Press PAUSE key to close the Tracking servo.
				VL1	Waveform is positioned at the center	• Adjust VL1 (VCO coil) with a core driver so that the waveform is positioned at the center.
					DC level of the waveforms is not changed	• Open and close the Tracking servo by depressing PAUSE key a few times and verify that the DC level of the waveforms is not changed.

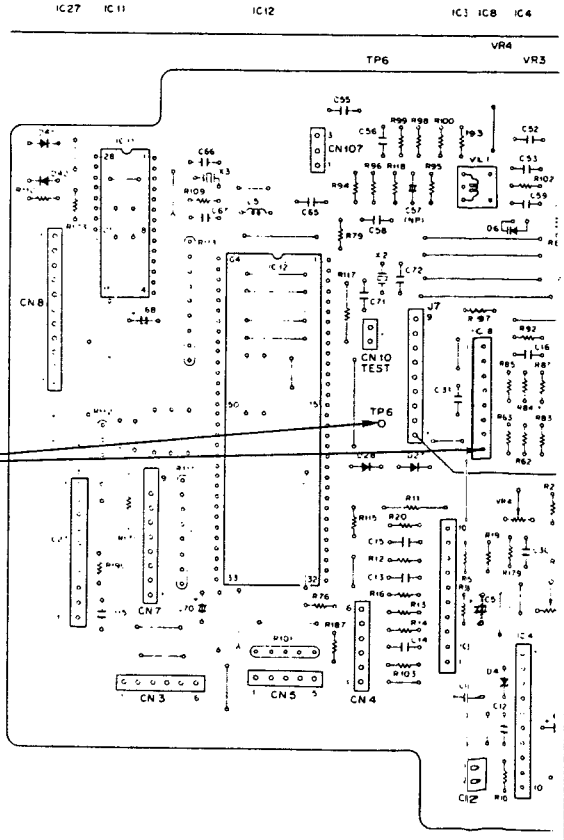


Fig. 7-8 VCO free-run frequency observe point

7. RÉGLAGE

• Points de réglage

1. Vérification de puissance de sortie de diode laser (LD)
2. Réglages de décalage d'alignement et de décalage de mise au point
3. Vérification de verrouillage de mise au point et d'axe
4. Réglage de quadrillage
5. Réglage d'équilibre d'alignement
6. Réglage tangentiel
7. Réglage de gain de mise au point
8. Réglage de gain d'alignement
9. Réglage de fréquence de fonctionnement libre VCO

• Equipements de mesure

1. Oscilloscope double tracé
2. Indicateur de puissance laser (LPM-8000)
3. Disque d'essai (YEDS-7)
4. Oscillateur AF
5. Tournevis de quadrillage (R-882)

• Mode d'essai

Tous les ajustements doivent être effectués en mode d'essai.

Procédures de mise en service et annulation du mode d'essai

(1)Pour passer en mode d'essai, allumer l'interrupteur d'alimentation (POWER) (S401) du lecteur en établissant un court-circuit entre les bornes TEST MODE.

(2)Pour annuler le mode d'essai, il suffit de ramener sur OFF l'interrupteur d'alimentation (POWER) du lecteur.

Les diverses fonctions des touches en mode d'essai sont reprises dans le Tableau 7-1.

• Points de réglage

VR2: Décalage d'alignement (TR.OF)
VR3: Gain de mise au point (FO.GA)
VR4: Gain d'alignement (TR.GA)
VR5: Equilibre d'alignement (TR.BL)
VR6: Décalage de mise au point (FO.OF)
VL1: Fréquence de fonctionnement libre VCO

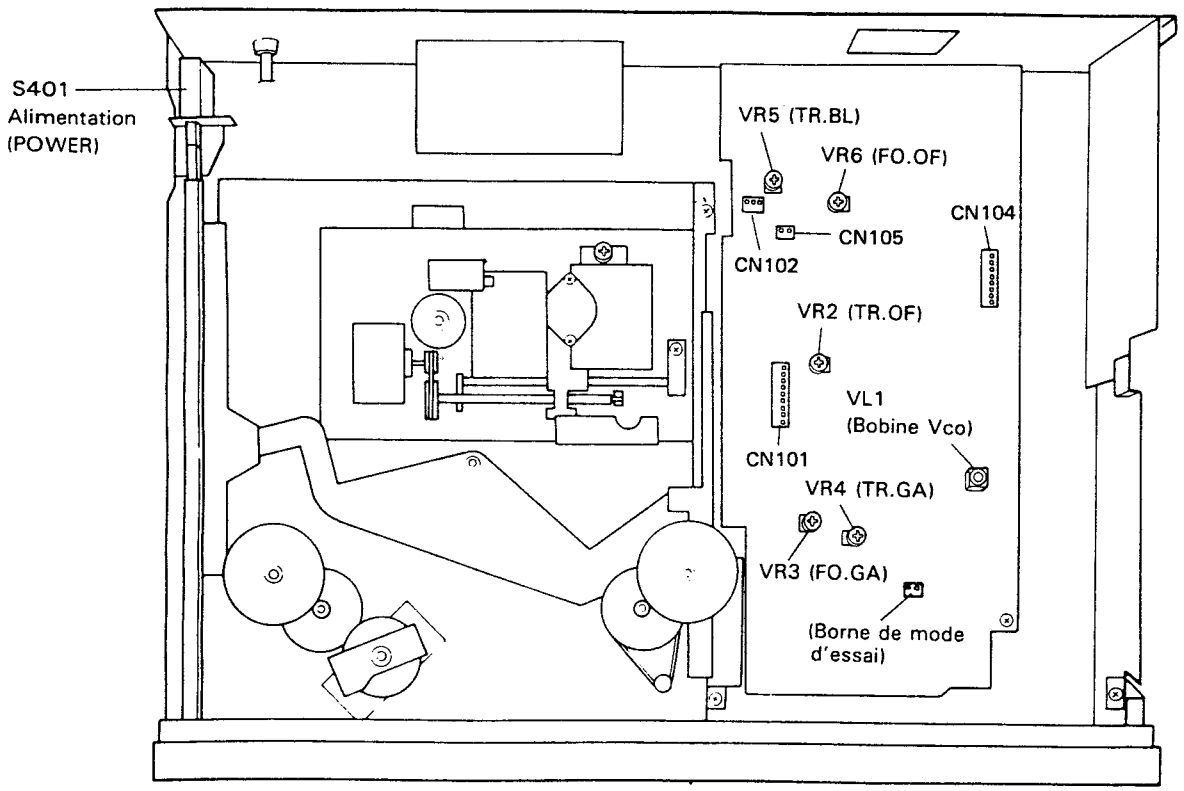
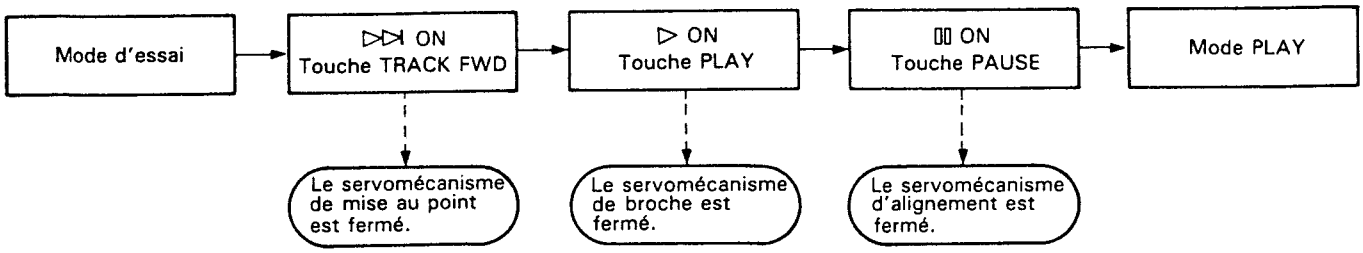


Fig. 7-1 Points de réglage

En mode d'essai, chaque servomécanisme peut être fermé et ouvert par des démarches distinctes. Part conséquent, chacun devra être fermé un à la fois (en séquence sérielle) pour passer au mode de lecture (PLAY).

Exemple: Passage du mode d'arrêt (STOP) au mode de lecture (PLAY).



- En mode d'essai, les servomécanismes fonctionnent en séquence sérielle.

• Fonctions des touches en mode d'essai

Symbole	Touche	Fonction en mode d'essai	Description
⏮	TRACK BACK	Diode laser allumée.	La diode laser s'allume.
⏭	TRACK FWD	Servomécanisme de mise au point fermé.	Le disque est logé depuis le magasin et immobilisé. La diode laser s'allume. L'actuateur se déplace à la verticale, puis le servomécanisme de mise au point est fermé.
▷	PLAY	Le servomécanisme d'axe est fermé.	L'axe commence à tourner et le servomécanisme est fermé quand la rotation atteint la vitesse optimale.
⏸	PAUSE	Le servomécanisme d'alignement est fermé/ouvert.	Le servomécanisme est fermé en appuyant une fois sur la touche; le témoin PAUSE s'allume et le lecteur passe en mode PLAY tandis que la durée écoulée est indiquée sur l'affichage fluorescent. Les servomécanismes de mise au point et d'axe doivent être fermés à ce stade. Quand la touche est de nouveau actionnée, le servomécanisme d'alignement est ouvert.
◁◁	MANUAL SEARCH REV	Déplacement arrière du chariot (vers le centre du disque)	Le chariot est déplacé vers le centre du disque à vitesse rapide d'environ 1 cm/sec. Comme il n'existe pas de mécanisme de sécurité pour arrêter le chariot, relâcher la touche avant qu'il n'arrive à la fin du disque.
▷▷	MANUAL SEARCH FWD	Déplacement avant du chariot (vers le bord du disque)	Le chariot est déplacé vers la fin du disque à vitesse rapide d'environ 1 cm/sec. Comme il n'existe pas de mécanisme de sécurité pour arrêter le chariot, relâcher la touche avant qu'il n'arrive au bord du disque.
▭	REPEAT	Déplacement verticale (haut/bas) de l'objectif	Le disque est chargé depuis le magasin et immobilisé. La dlode laser s'allume. L'actuateur se déplace deux fois vers le haut et le bas, puis le disque est ramené dans le magasin. Le servomécanisme de mise au point n'est pas fermé.
□	STOP	STOP	Tous les servomécanismes sont ouverts.
⏏	EJECT	Le magasin est éjecté.	Le magasin ressort. Cependant, le capteur ne revient pas à la position de repos.
1-6	DISC 1-6 KEY	Sélection du disque	Un disque peut être choisi dans le système six-disques. Si la touche TRACK FWD ou REPEAT est actionnée sans sélection d'un disque, le lecteur choisit automatiquement le premier disque.

Tableau 7-1

Remarquer que le mode PLAY n'est pas actualisé par simple poussée sur la touche PLAY en mode d'essai. Pendant la sélection ou le chargement d'un disque, ne pas tenter d'effectuer d'autres opérations.

REMARQUES:
1) Le réglage suivant doit être effectué en mode d'essai. Consulter la page 46 pour placer le lecteur en mode d'essai.
2) Le réglage suivant, sauf (1. Vérification de puissance de sortie de LD) doit être effectué avec un disque d'essai (YEDS-7).
   Placer le disque d'essai avec sa face enregistrée vers le haut dans un magasin et installer celui-ci dans le lecteur.
3) La description des réglages suivants commence à partir de l'état "STOP".

N°. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos deprueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
1	**VERIFICATION DE PUISSANCE DE SORTIE DE DIODE LASER (LD)** *Remarque:* *Ce point peut être ignoré lors d'un entretien normal. On ne fera cette vérification que si la puissance semble faible ou si la diode laser semble défectueuse.*					
				VR1	0,26 mW ± 0,02 mW	Pour vérifier la puissance de sortie du laser, le capteur doit être retiré du châssis du mécanisme par les démarches suivantes. • Couper l'interrupteur d'alimentation. • Enlever la courroie A. • Déposer la fixation de barre de guidage. • Desserrer la vis de commande. • Soulever lentement l'ensemble du capteur en laissant le câble plat connecté. Prendre soin de ne pas établir un court-circuit entre la plaquette de circuit imprimé sur la capteur et le châssis. • Régler le lecteur en mode d'essai. • Placer le senseur de d'indicateur de puissance de laser (LPM-8000) sur l'objectif. • Appuyer sur la touche TRACK REV pour mettre le laser en service. • Vérifier que la puissance de sortie du laser respecte la plage spécifiée (0,26 ± 0,02 mW). Dans la négative, ajuster VR1 sur le capteur pour convenir à la spécification. • Couper l'interrupteur d'alimentation. • Réassembler les pièces déposées.
2	**REGLAGE DE DECALAGE D'ALIGNEMENT ET DE MISE AU POINT**					
	20mV /div	1 mS /div	CN101 broche 9 (TR.RT)	VR2 (TR.OF)	0V ± 10mV	• Raccorder un oscillateur ou un voltmètre sur CN101 broche 9 TR-RT (retour alignement). Ajuster VR2 TR.OF (décalage alignement) de sorte que la tension à la broche 9 de CN101 devienne 0V ± 10 mV.
	20 mV /div	1 mS /div	CN101 broche 3 (FO.ER)	VR6 (FO.OF)	0V ± 10 mV	• Raccorder un oscillateur ou un voltmètre sur la broche 3 de CN101 FO.ER (erreur de mise au point). Ajuster VR6 FO.OF (décalage de mise au point) de sorte que la tension à la broche 3 de CN101 devienne 0V ± 10 mV.

N°. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos deprueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
3	**VERIFICATION DU VERROUILLAGE DE MISE AU POINT ET D'AXE**					
	0,2 V /DIV	10 μS /DIV	Broche 1 CN105(RF)		Un signal RF est produit.	• Appuyer sur la touche MANUAL SEARCH FWD pour amener le capteur vers le milieu du disque. Remarquer que cette démarche doit être accomplie. • Raccorder l'oscilloscope à CN105 broche 1 RF (sortie RF) et vérifier que le signal haute fréquence est produit quand la touche TRACK FWD est actionnée (quand le servomécanisme de mise au point est fermé). • Appuyer sur la touche PLAY et vérifier que le disque tourne à la vitesse optimale (environ 300 tr/mn au milieu de disque) dans le sens anti-horaire.
					Rotation anti-horaire	
4	**REGLAGE DU QUADRILLAGE**					
	1V /DIV	10mS /div	CN101 broche 4 (TR.ER)	Quadrillage	Point NUL (enveloppe petite et douce	• Appuyer sur les touches TRACK FWD et PLAY pour fermer les servomécanismes de mise au point et d'axe (en laissant ouvert le servomécanisme d'alignement). • Raccorder l'oscilloscope sur CN101 broche 4 TR.ER (erreur d'alignement) par un L.R.F. de 4 kHz comme indiqué sur la Fig. 7-2. • Insérer le tournevis dans l'orifice de réglage du capteur comme indiqué à la Fig. 7-3. Le tourner lentement et trouver le point NUL. (Voir photo 7-1.) Remarque: Si le capteur est levé par le tournevis pendant ce réglage, abaisser légèrement le capteur. • Tourner lentement le tournevis dans le sens des aiguilles à partir du point NUL et arrêter au point où la forme d'onde du signal d'erreur d'alignement atteint le maximum (voir photo 7-3).
	CH-1 50mV/div	mode X-Y	CH-1 CN102 broche 1 (BKTE)			• Raccorder l'oscilloscope CH-1 sur CN102 broche 1 (BKTE) et CH-2 à CN102 broche 2 (FWTE). Régler l'interrupteur AC-GND-DS de l'oscilloscope sur AC et le mode sur X-Y.
	CH-2 50mV/div Couplage CA		CH-2 CN102 broche 2 (FWTE)		Ligne droite de 45 degrés	• Tout en observant la figure Lissajous (voir photo 7-4), ajuster le quadrillage avec précision jusqu'au point où le Lissajous devient une ligne oblique p 45 degrés. (Voir photo 7-5)

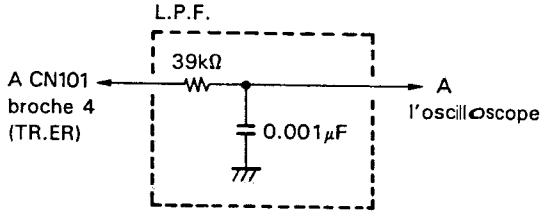


Fig. 7-2 4KHz L.P.F.

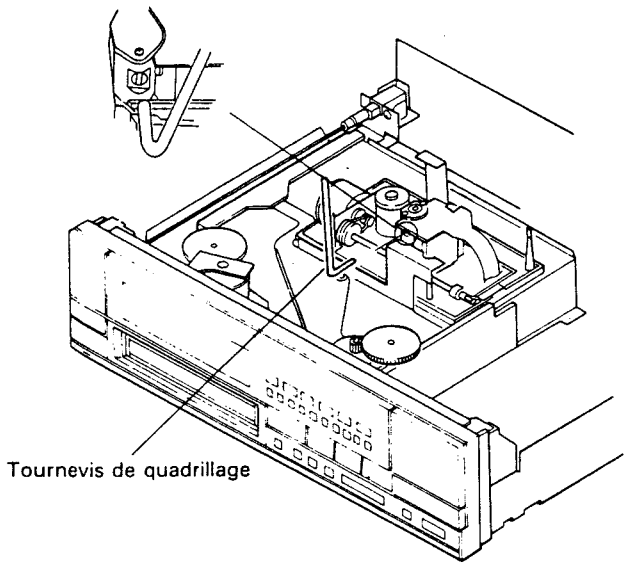


Fig. 7-3 Réglage de quadrillage

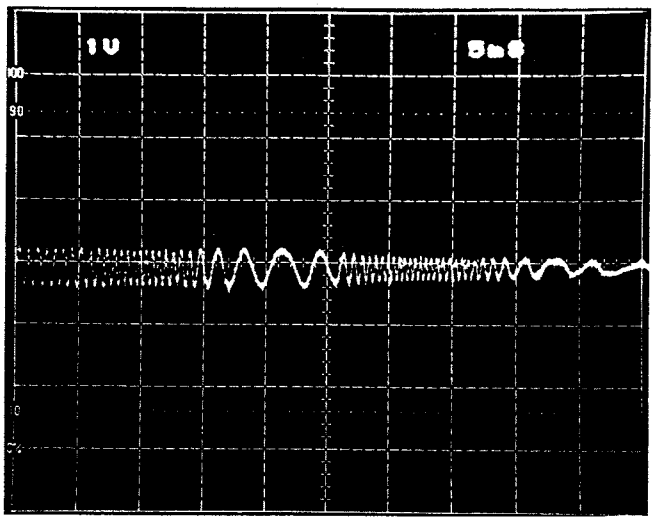


Photo 7-1
Enveloppe petite et douce (point NUL)

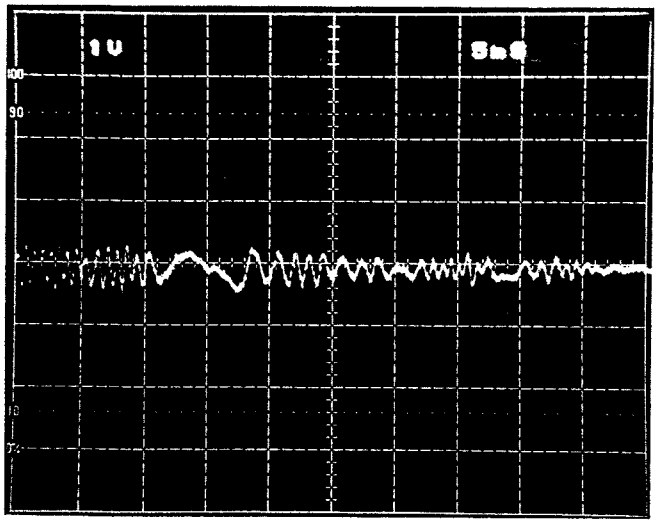


Photo 7-2
Enveloppe petite mais grossière (pas le point NUL)

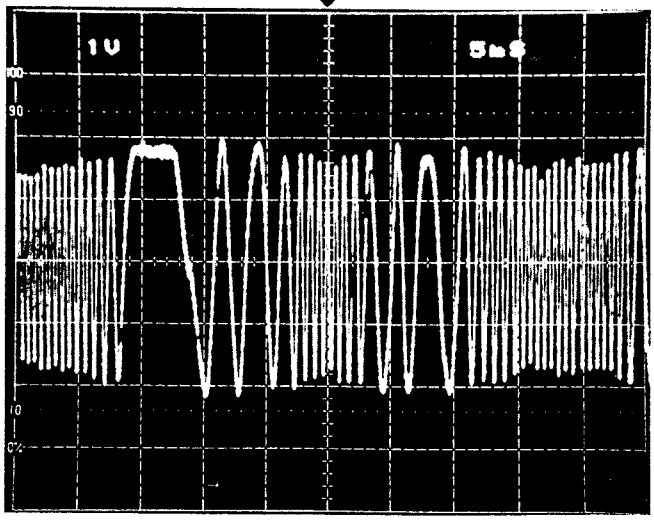


Photo 7-3 Amplitude maximum

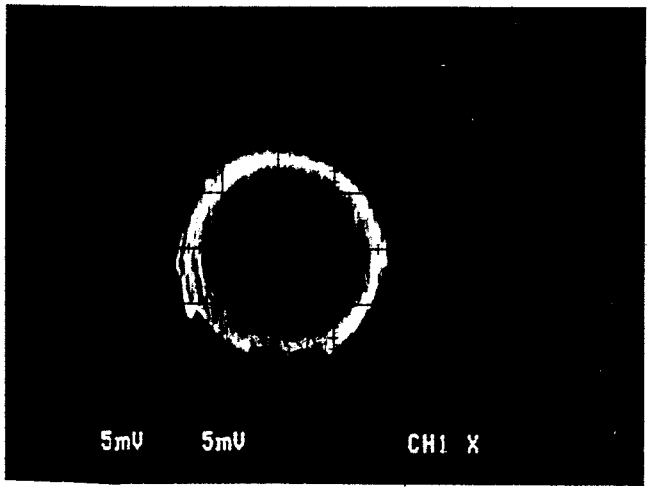


Photo 7-4 Figures Lissajous (avant réglage)

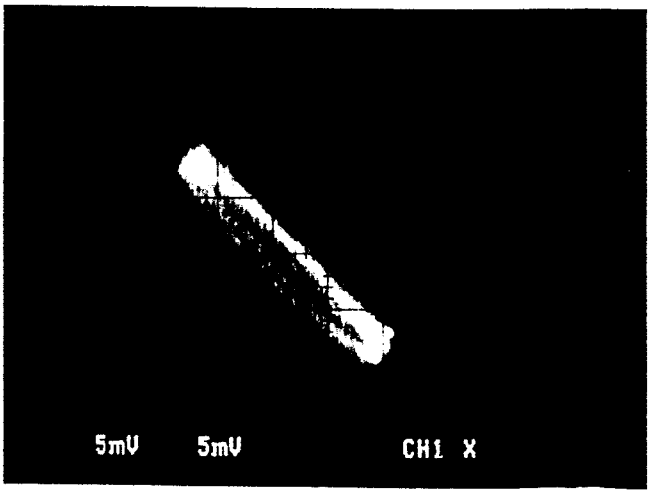


Photo 7-5 Figures Lissajous (après réglage)

N° d' étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle/ Spécifications de réglage	Procédure de réglage
5	**REGLAGE D'EQUILIBRE D'ALIGNEMENT**					
	1 V /div	10 mS /div	CN101 broche 4 (TR.ER)	VR5 (TR.BL)	Amplitude positive et négative égale (A = B)	• Appuyer sur la touche MANUAL SEARCH FWD pour déplacer la capteur près du milieu du disque. • Appuyer sur la touche TRACK FWD et PLAY pour lancer la ratation du disque. • Régler le niveau GND de l'oscilloscope au centre. • Raccorder l'oscilloscope à CN101 broche 4TR.ER (erreur d'alignement) par un L.P.F. indiqué sur la Fig. 7-2. Ajuster VR5 TR.BL (equilibre d'alignement) de sorte que l'amplitude positive et négative de la forme d'onde soit égale, comme sur la photo 7-7.
6	**REGLAGE PICK UP ANGLE**					
	0,2 V /DIV	0,2 μS /DIV	CN105 broche 1 (RF)	Pick up angle réglage tangentiel	Meilleur modèle de vue	• Appuyer sur les touches TRACK FWD, PLAY et PAUSE pour fermer tous les servomécanismes. (Le témoin PAUSE doit être allumé.) • Raccorder l'oscilloscope sur CN105 broche 1 RF (sortie haute fréquence) par une résistance de 10 k-ohms. Utiliser une résistance de 5 k-ohms si la forme d'onde n'est pas claire. • Ajuster la vis de réglage pick up pour obtenir le modèle le plus clair possible comme sur la photo 7-8. Le point de réglage optimal se trouve à mi-course entre les deux points à partie duquel le modèle commence à se détériorer quand la vis de réglage pick up est tournée dans le sens horaire ou anti-horaire.

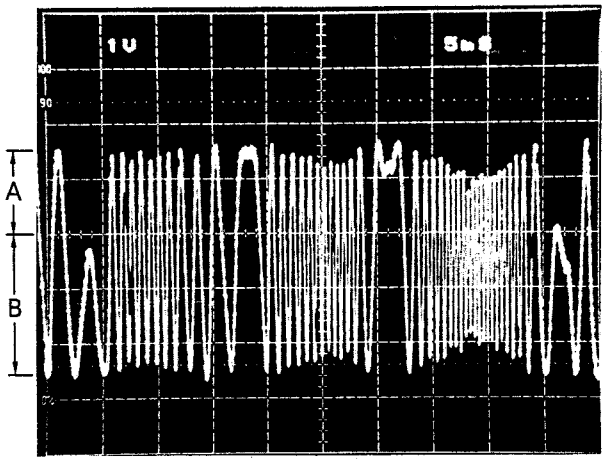


Photo 7-6 A<B

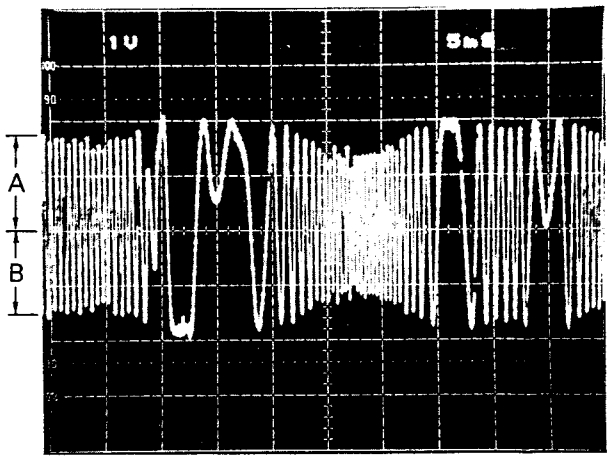


Photo 7-7 A = B

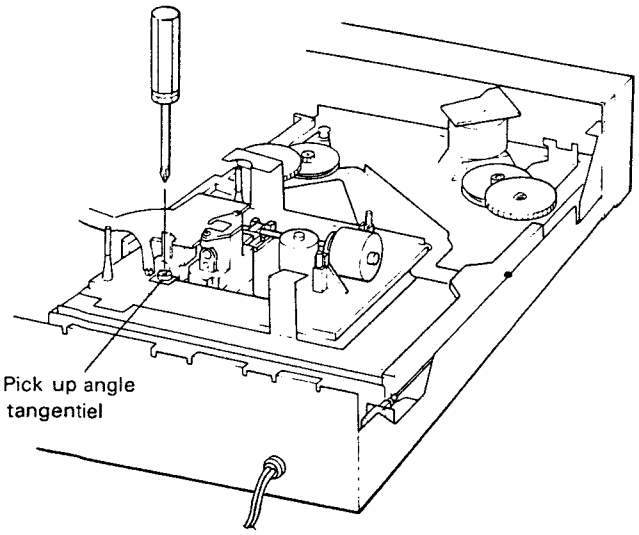


Fig. 7-5 Réglage pick up angle

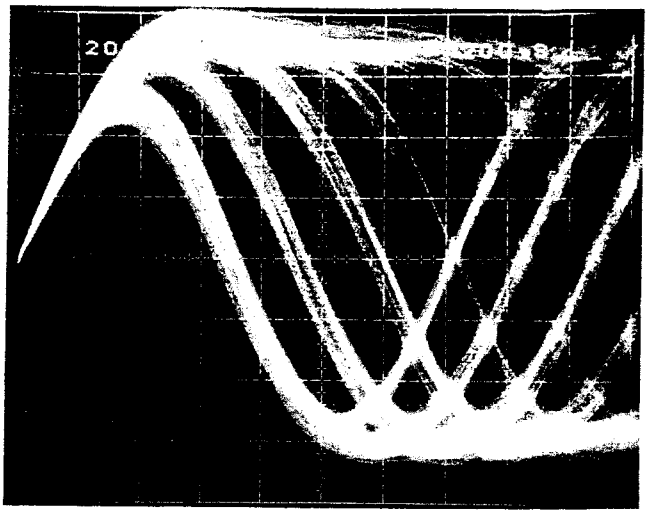
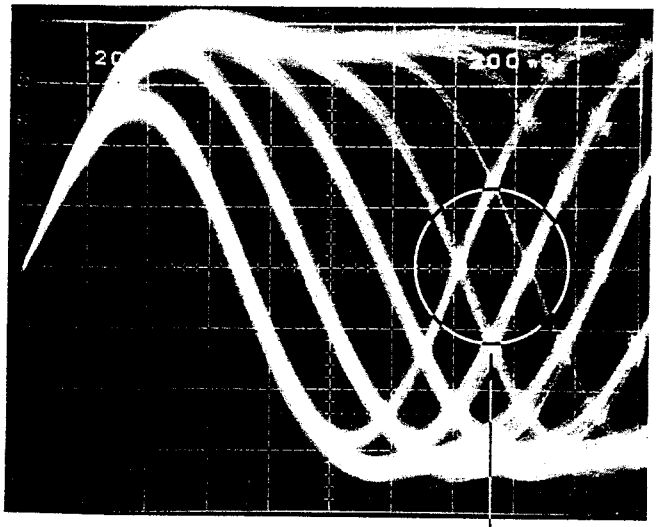


Photo 7-9



Partie à observer

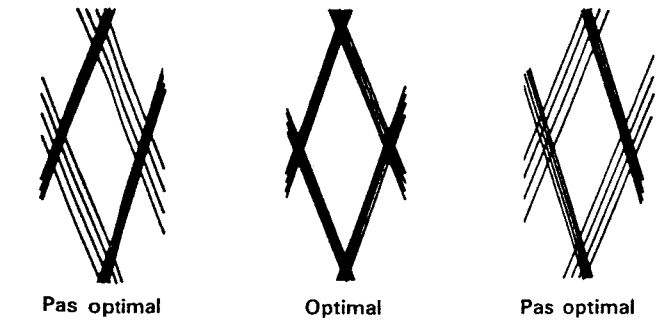


Photo 7-8

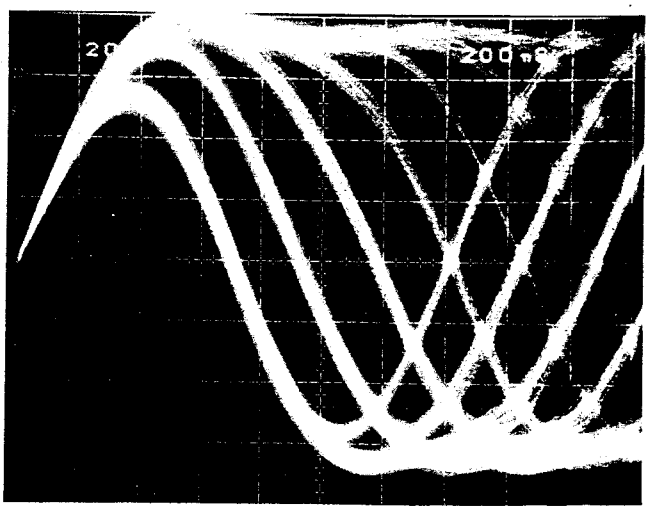


Photo 7-10

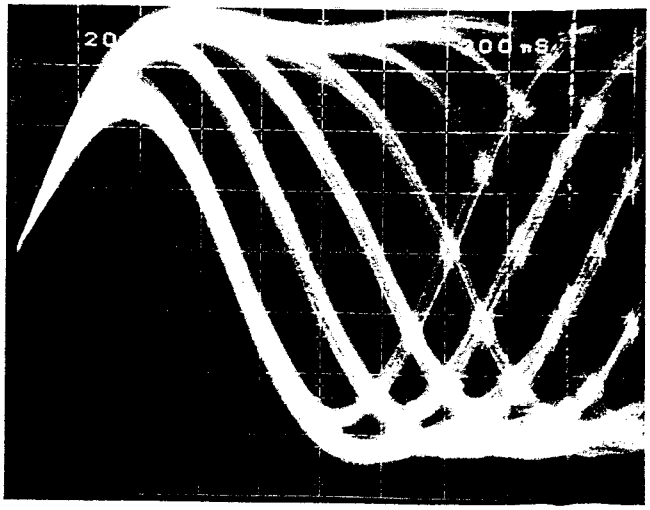


Photo 7-11

N° d' étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle/ Spécifications de réglage	Procédure de réglage
7	**REGLAGE DE GAIN DE MISE AU POINT (SANS UTILISATION D'UN AJUSTEUR FTG)**					
	50 mV /div	0,5 mS /div	Borne de sortie Osc. AF	Réglage de sortie Osc. AF	880Hz 0,2Vp-p	• Raccorder l'oscilloscope à la borne de sortie de l'oscilloscope AF et ajuster sa sortie à 880 Hz et 0,2 Vc-c. (La sortie d'oscillateur AF doit être ajustée avant la connexion décrite ci-après.) • Appuyer tour à tour sur les touches TRACK FWD, PLAY et PAUSE pour fermer tous les servomécanismes.
	Ch-1 20 mV /div CH-2 50 mV /div	Mode X-Y	CH-1 CN101 broche 6 (FO. IN et sortie Osc. AF) CH-2 CN101 broche 1 (FO.OT)	VR3 (FO.GA)	Figures Lissajous symétriques	• Raccorder l'oscilloscope, un oscillateur AF et une résistance au lecteur comme indiqué sur la Fig. 7-6. Régler l'oscilloscope en mode X-Y. • Ajuster VR3 FO.GA (gain de mise au point) de sorte que les figures Lissajous deviennent symétriques. (Voir photo 7-13)

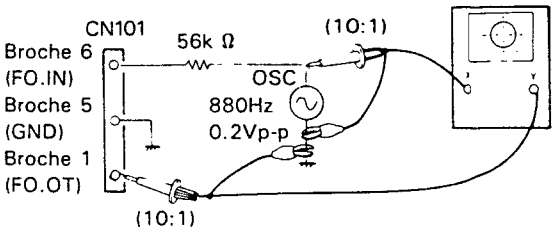


Fig. 7-6

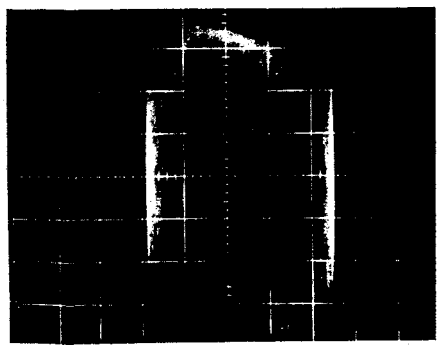


Photo 7-12 Gain faible

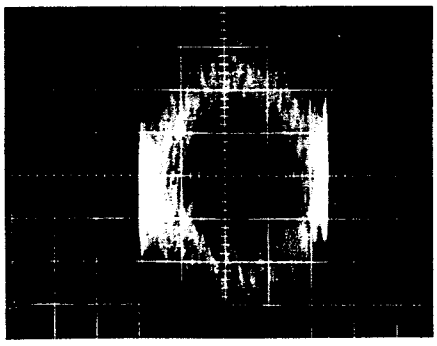


Photo 7-13 Gain optimal

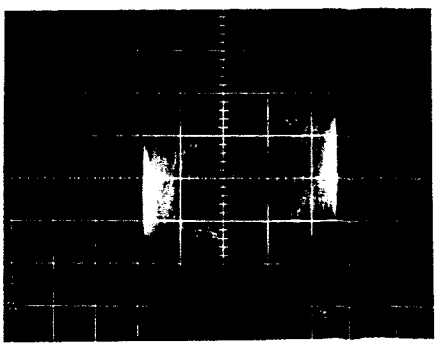


Photo 7-14 Gain élevé

N° d' étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle/ Spécifications de réglage	Procédure de réglage
8	**REGLAGE DE GAIN D'ALIGNEMENT (SANS UTILISATION D'UN AJUSTEUR FRG)**					
	0,1V /div	0,5 mS /div	Borne de sortie Osc. AF	Réglage de sortie Osc. AF	1130Hz 0,4Vc-c	• Raccorder l'oscilloscope à la borne de sortie de l'oscillateur AF et ajuster sa sortie à 1130 Hz et 0,4 Vc-c. (La sortie d'oscillateur doit être ajustée avant la connexion décrite ci-après.) • Appuyer tour à tour sur les touches TRACK FWD, PLAY et PAUSE pour fermer tous les servomécanismes.
	CH-1 50mV /div CH-2 50mV /div	Mode X-Y	CH-1 CN101 broche 7 (TR.IN et sortie OSC. AF) CH-2 CN101 broche 2 (TR.OP)	VR4 (TR.GA)	Figures Lissajous symétriques	• Raccorder l'oscilloscope, l'oscillateur AF et une résistance au lecteur comme illustré sur la Fig. 7-7. Régler l'oscilloscope en mode X-Y. • Ajuster VR4 TR.GO (gain d'alignement de sorte que les figures Lissajous soient symétriques. (Voir photo 7-16)

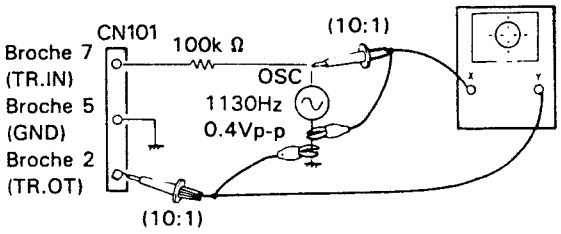


Fig. 7-7

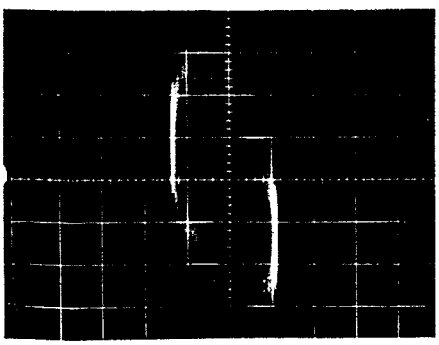


Photo 7-15 Gain faible

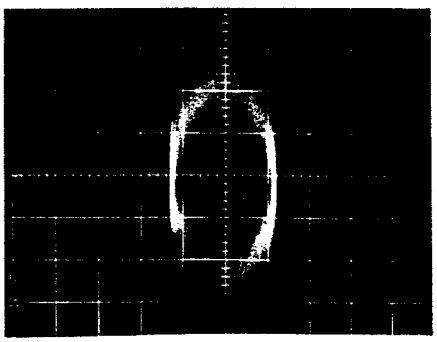


Photo 7-16 Gain optimal

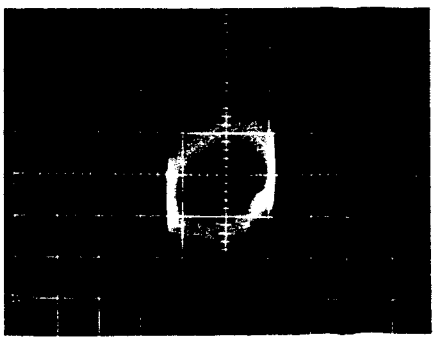


Photo 7-17 Gain élevé

N° d' étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle/ Spécifications de réglage	Procédure de réglage
9	**REGLAGE DE GAIN DE MISE AU POINT ET D'ALIGNEMENT AVEC UTILISATION D'UN AJUSTEUR FTG**					
						• Allumer l'interrupteur POWER qui se trouve sur le flanc droit de l'ajusteur FTG. Tourner sur 1 le sélecteur de l'ajusteur FTG, situé sur le côté gauche du panneau.
						• Raccorder l'oscilloscope sur TP (point d'essai) de l'ajusteur FTG. Le point TP est situé sur le côté droit du sélecteur.
				Potentiomètres FREQ-1 d'ajusteur FTG		• Ajuster les potentiomètres FREQ-1 de l'ajusteur FTG de sorte que la fréquence de sortie devienne 880 Hz. La fréquence est indiquée par trois diodes LED à 7 segments sur l'ajusteur FTG.
	50 mV /div	0,5 mS /div	TP d'ajusteur TFG	Potentiomètres GAIN-1 d'ajusteur FTG		• Ajuster les 2 potentiomètres GAIN-1 de l'ajusteur FTG de sorte que l'amplitude du signal de sortie devienne 0.2 Vc-c.
						• Tourner sur 2 le sélecteur de l'ajusteur FTG.
				Potentiomètres FREQ-2 d'ajusteur FTG		• Ajuster les deux potentiomètres FREQ-2 de l'ajusteur FTG de sorte que la fréquence de sortie devienne 1130Hz.
	0,1V /div	0,5 mV /div	TP d'ajusteur FTG	Potentiomètres GAIN-2 d'ajusteur FTG		• Ajuster les deux potentiomètres GAIN-2 de l'ajusteur FTG de sorte que l'amplitude du signal de sortie devienne 0,4 Vc-c.
						• Tourner le Sélecteur à la position neutre (centre).
						• Raccorder le fil orange de l'ajuster FTG sur CN101 broche 6 (FO.IN) du lecteur, le fil brun sur CN101 broche 1 (FO.OT), le fil jaune sur CN101 broche 7 (TR.IN), le fil rouge sur TP1 broche 2 (TR.OT) et le fil noir au châssis.
						• Appuyer tour à tour sur les touches TRACK FWD, PLAY et PAUSE pour fermer tous les servomécanismes.
				VR3 (FO.GA)	Diode LED verte (JUST) allumée	• Tourner à 1 le Sélecteur. Ajuster VR3 FO.GAI (gain de mise au point) de sorte que s'allume la diode LED verte (JUST).
				VR4 (TR.GA)	Diode LED verte (JUST) allumée	• Tourner à le Sélecteur de l'ajusteur FTG. Ajuster VR4 TR.GO (gain d'alignement) de sorte que s'allume la diode LED verte (JUST).

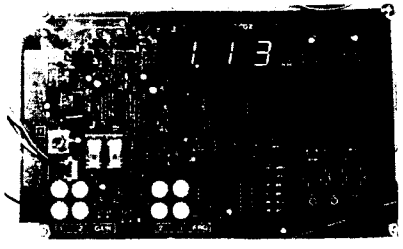


Photo 7-18 Ajusteur FTG

N° d'étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle/ Spécifications de réglage	Procedimiento de ajuste
10	**REGLAGE DE FREQUENCE DE FONCTIONNEMENT LIBRE VCO**					
	0,5V /DIV	0,1 μS /DIV	Conducteur de broche 8 de IC8 plaquette (TP6) Main		Forme d'onde positionnée au centre	• Raccorder l'oscillateur au conducteur de broche 8 de u IC8 (TP6) de la plaquette VCO. (Voir Fig. 7-9) • Appuyer tour à tour sur les touches TRACK FWD et PLAY pour fermer les servomécanismes de mise au point et d'axe. • Tourner sur DC le sélecteur AC-GND-DC de l'oscilloscope. • Ajuster la position verticale de l'oscilloscope de sorte que la forme d'onde soit positionnée au centre. Remarque: Il n'est pas nécessaire de régler le niveau GND au centre de l'oscilloscope au cours de ce réglage. Positionner simplement la forme d'onde au centre de l'oscilloscope par le réglage de position verticale. • Appuyer sur la touche PAUSE pour fermer le servomécanisme d'alignement.
				VL1	Forme d'onde positionnée au centre Le niveau CC des formes d'onde n'est pas changé.	• Ajuster VL1 (bobine VCO) avec un tournevis de sorte que la forme d'onde soit positionnée au centre. • Ouvrir et fermer le servomécanisme d'alignement par quelques poussées sur la touche PAUSE et vérifier que le niveau DC des formes d'ondes n'est pas changé.

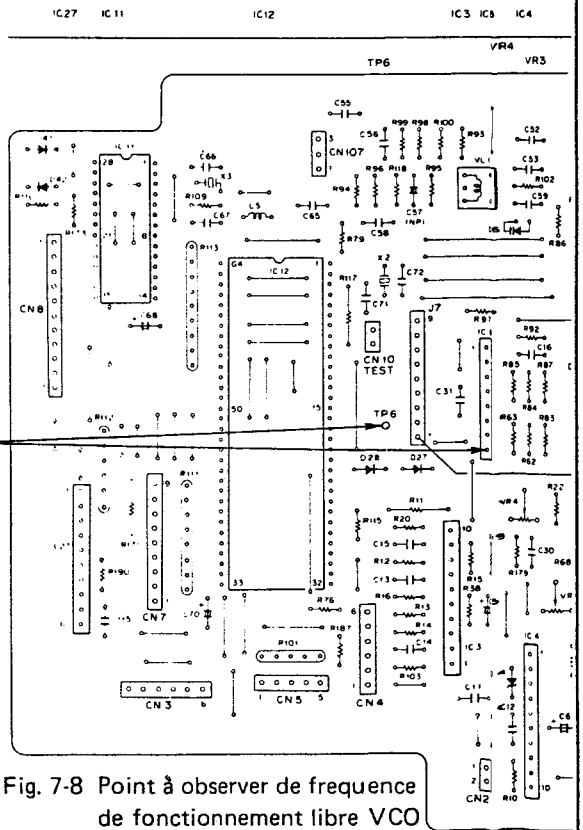


Fig. 7-8 Point à observer de frequence de fonctionnement libre VCO

7. AJUSTE

• Tipos de ajustes

1. Verificación de la energía de salida del LD (diodo de láser)
2. Ajustes del descentramiento de seguimiento y del descentramiento del enfoque
3. Verificación de bloqueo del enfoque y de bloqueo del pivote
4. Ajuste de la rejilla
5. Ajuste de equilibrio de seguimiento
6. Ajuste tangencial
7. Ajuste de ganancia de enfoque
8. Ajuste de ganancia de seguimiento
9. Ajuste de la frecuencia de funcionamiento libre del VCO.

• Equipos de medición

1. Osciloscopio de trazado doble
2. Medidor de energía de láser (LPM-8000)
3. Disco de prueba (YEDS-7)
4. Oscilador de AF
5. Excitador de rejilla

• Mode de prueba

Todos los ajustes deben efectuarse en el modo de prueba.

Ajuste del modo de prueba y procedimientos de cancelación

(1)Para ajustar el modo de prueba conecte (ON) el interruptor de alimentación (POWER) del reproductor (S401) cortocircuitando los terminales del mode de prueba (TEST MODE TERMINAL).
(2)Para cancelar el mode de prueba, desconecte (OFF) simplemente el interruptor de alimentación (POWER) del reproductor.

Las funciones de las diversas teclas en el modo de prueba se enumeran en la tala 7-1.

• Puntos de ajuste

VR2: Descentramiento de seguimiento (TR.OF)
VR3: Ganancia de enfoque (FO.GA)
VR4: Ganancia de seguimiento (TR.GA)
VR5: Equilibrio de seguimiento (TR.BL)
VR6: Descentramiento de enfoque (FO.OF)
VL1: Frecuencia de funcionamiento libre del VCO.

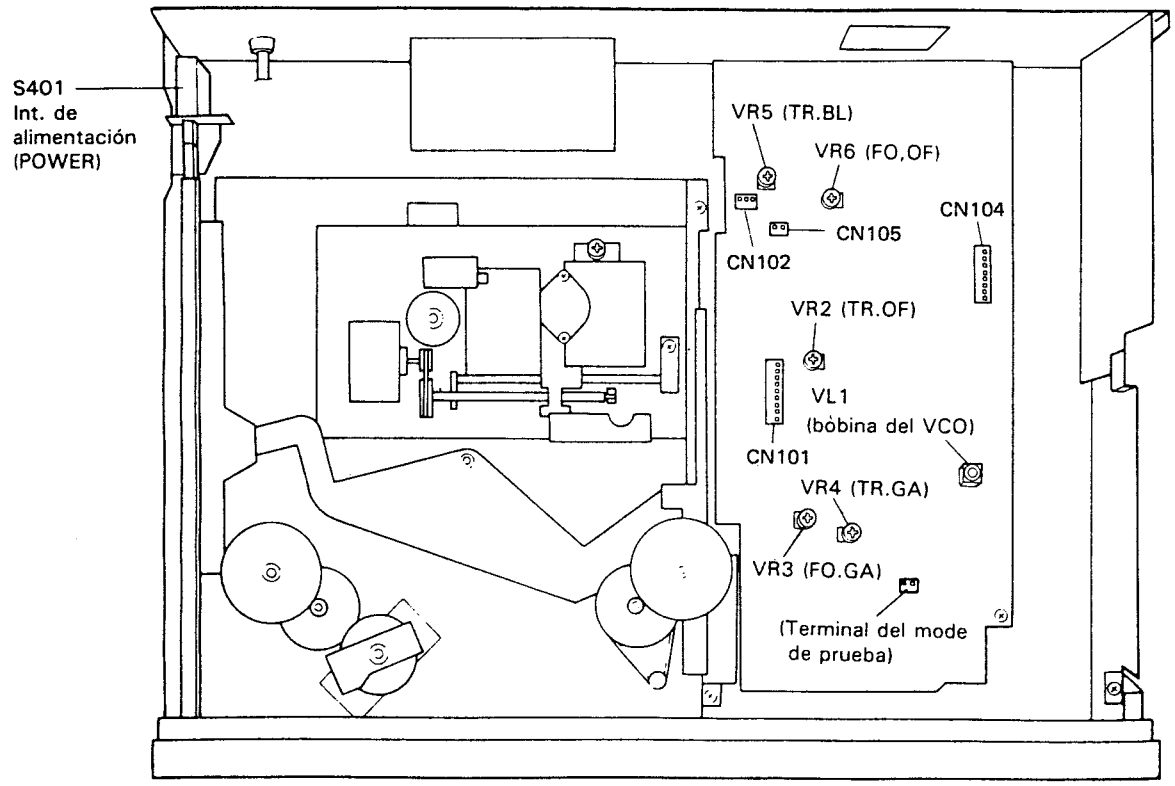
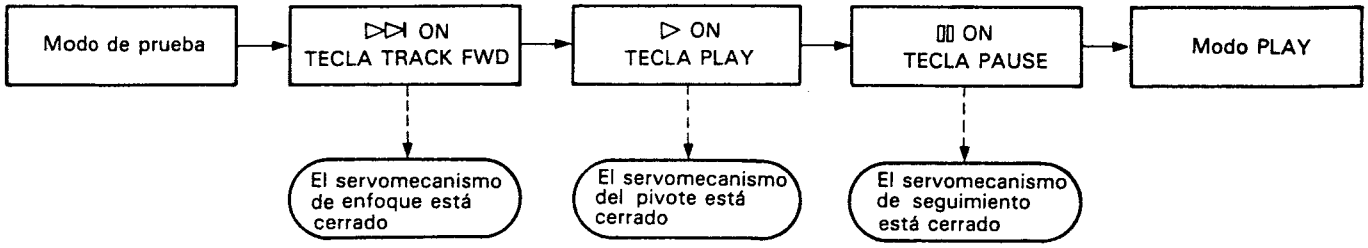


Fig. 7-1 Puntos de ajuste

En el modo de prueba, cada servocircuito puede cerrarse y abrirse mediante operaciones independientes. Consecuentemente, cada servocircuito debe estar cerrado en cierto momento (secuencia en serie) para establecer el modo de reproducción (PLAY).

Tenga presente que el modo de reproducción (PLAY) no se activa presionando simplemente la tecla de reproducción (PLAY) en el modo de prueba.
Mientras se selecciona o carga un disco, no intente efectuar otras operaciones.

Ejemplo: Conmutación del modo del parada (STOP) al de reproducción (PLAY)



- Los servomecanismos operan en secuencia en serie durante el modo de prueba.

• Funciones de las teclas en el modo de prueba

Símbolo	Tecla	Función durante el modo de prueba	Descripción
⏮	TRACK BACK	Diodo láser activado (ON).	Se enciende el diodo láser.
⏭	TRACK FWD	El servomecanismo de enfoque está cerrado.	Se carga el disco desde el compartimiento y se enclava. Se enciende el diodo láser. El accionador se mueve hacia arriba y abajo y luego se cierra el servomecanismo de enfoque.
▷	PLAY	El servomecanismo del pivote está cerrado.	El pivote empieza a girar y el servomecanismo se cierra cuando las revoluciones alcanzan la velocidad óptima.
▯▯	PAUSE	El servomecanismo de seguimiento está cerrado/abierto.	El servomecanismo de seguimiento se cierra presionando una vez la tecla, se enciende el indicador de pausa (PAUSE) y el reproductor se establece en el modo de reproducción (PLAY) con el tiempo transcurrido indicado en el visualizador fluorescente. Los servomecanismo de enfoque y de pivote deben estar cerrados en este momento. Cuando se presiona de nuevo la tecla, se abre el servomecanismo de seguimiento.
◁◁	MANUAL SEARCH REV	El carro se mueve hacia atrás (hacia el centro del disco)	El carro se mueve hacia el centro del disco a rápida velocidad de aprox. 1 cm/s. Puesto que no hay mecanismo de seguridad para detener el carro, suelte la tecla cuando el carro llegue al final.
▷▷	MANUAL SEARCH FWD	El carro se mueve hacia adelante (hacia el extremo del disco)	El carro se mueve hacia el extremo del disco a rápida velocidad de aprox. 1 cm/s. Puesto que no hay mecanismo de seguridad para detener el carro, suelte la tecla cuando el carro llegue al final.
▭	REPEAT	El objetivo se mueve hacia arriba y abajo.	El disco se carga desde el compartimiento y se enclava. Se enciende el diodo láser. El accionador se mueve hacia arriba y abajo dos veces y el disco se repone en el compartimiento. El servomecanismo de enfoque no se cierra.
□	STOP	Parada (STOP)	Se abren todos los servomecanismos.
⏏	EJECT	Sale expulsado el compartimiento..	El compartimiento sale expulsado. Sin embargo, el fonocaptor no retorna a la posición de reposo.
1-6	DISC 1-6 KEY	Se selecciona el disco	Puede seleccionarse un disco del sistema de seis discos. Si se presionan las teclas de avance de canciones (TRACK FWD) o de repetición (REPEAT) sin haber seleccionado un disco, el reproductor selecciona automáticamente el primer disco.

Tabla 7-1

NOTAS:
1) Los ajustes siguientes deben efectuarse en el modo de prueba. Consulte la página 57 para establecer el reproductor en el modo de prueba.
2) El ajuste siguiente, excepto [1. VERIFICACION DE LA ENERGIA DE SALIDA DEL DIODO LASER] debe efectuarse con un disco de prueba (YEDS-7). Ponga el disco de prueba grabado en la parte de arriba en el compartimiento e inserte el compartimiento en el reproductor.
3) La descripción de los ajustes siguientes empieza por "STOP".

N°. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
1	**VERIFICACION DE LA ENERGIA DE SALIDA DEL DIODO DE LASER** *NOTE:* *Este ítem puede saltarse bajo el servicio normal. Debe verificarse sólo cuando la energia de láser parezca ser débil o cuando el diodo láser parezca estar defectuoso.*					
				VR1	0,26 mw ±0,02 mW	Para verificar la energía de salida de láser, debe sacarse el foocaptor del clasis del mecanismo en elprocedimiento siguiente. • Desconecte el interruptor de alimentación. • Libere la correa A. • Saque el retenedor de la barra guía. • Afloje el tornillo de fijación. • Levante lentamente el conjunto del fonocaptor al revés manteniendo el cable plano conectado. Tenga cuidado en no cortocircuitar la tajerta de circuito impreso del fonocaptor con el chasis. • Ajuste el reproductor al modo de prueba. • Ponga el sensor del medidor de energía de láser (LPM-8000) encima del objetivo. • Presione la tecla TRACK REV para activar el láser. • Verifique que la energía de salida de láser esté dentro del margen especificado (0,26 ±0,02 mW). Si no es así, ajuste VR1 del fonocaptor para satisfacer las especificaciones. • Desconecte el interruptor de alimentación. • Vuelva a montar las partes.
2	**AJUSTE DEL DESCENTRAMIENTO DE SEGUIMIENTI Y DESCENTRAMIENTO DE ENFOQUE**					
	20 mV /div	1 ms /div	Patilla 9 de CN101 (TR.RT)	VR2 (TR.OF)	0V ±10 mV	• Conecte el osciloscopio o voltímetro a la patilla 9 de CN101 TR.RT (retorno de seguimiento). Ajuste VR2 TR.OF (descentramiento de seguimiento) de modo que la tensión en la patilla 9 de CN101 pase a ser de 0 V ±10mW.
	20 mV /div	1 ms /div	Patilla 3 de CN101 (FO.ER)	VR6 (FO.OF)	0V ±10 mV	• Conecte el osciloscopio o voltímetro a la patilla 3 de CN101 FO.ER (error de enfoque) Ajuste VR6 FO.OF (descentramiento de enfoque) de modo que la tensión en la patilla 3 de CN101 pase a ser de 0 V ±10 mW.

N°. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
3	**VERIFICACION DE BLOQUEO DE ENFOQUE Y BLOQUEO DE PIVOTE**					
	0,2V /div	10 μs /div	Patilla 1 de CN105 (RF)		Se genera la señal de RF	• Presione la tecla MANUAL SEARCH FWD para mover el fonocaptor más cerca de la parte intermedia del disco. Tenga presente que este paso debe realizarse. • Conecte el osciloscopio a la patilla 1 de CN105 RF (salida RF) y verifique que se genera la señal de RF cuando se presiona la tecla TRACK FWD (cuando se cierra el servomecanismo de enfoque).
					Rotación hacia la izquierda	• Presione la tecla PLAY y compruebe que gire el disco a la velocidad óptima (unas 300 rpm en la mitad del disco) en la dirección hacia la izquierda.
4	**AJUSTE DE LA REJILLA**					
	1V /div	10 ms /div	Patilla 4 de CN101 (TR.ER)	Rejilla	Punto NULL (envolvente pequeña y uniforme)	• Presione las teclas TRACK FWD y PLAY por turnos para cerrar los servomecanismos de enfoque y del pivote (dejando el servomecanismo de seguimiento abierto). • Conecte el osciloscopio a la patilla de 4 de CN101 TR.ER (error de seguimiento) a través de L.P.F. de 4 kHz como se muestra en la Fig. 7-2. • Inserte el excitador de rejila en elorificio de ajuste del fonocaptor como se muestra en la Fig. 7-3. Gírelo lentamente y busque el punto nulo (NULL) (vea la fotografía 7-1). Nota: Si se levanta el fonocaptor con el excitador de rejilla durante el ajuste, retenga un poco bajado el fonocaptor.
					Amplitud máxima	• Gire el excitador de rejilla lentamente hacia la derecha desde el punto NULL y párelo en el punto en que la forma de onda de la señal de error de seguimiento llegue primero al punto máximo. (Vea la fotografía 7-3).
	Canal 1 50 mV/div Canal 2 50 mV/div Acoplamiento de CA	Modo X-Y	Canal 1 Patilla 1 de CN102 (BKTE) Canal 2 Patilla 2 de CN102 (FWTE)		Línea recta de 45 grados	• Conecte el canal 1 del osciloscopio a la patilla 1 de CN102 (BKTE) y el canal 2 a la patilla 2 de CN102 (FWTE). Ajuste el interruptor AC-GND-DC del osciloscopio a AC y el modo a X-Y. • Mientras observa el patrón de Lissajous (veala fotografía 7-4), ajuste con precisión la rejilla al punto en el que el patrón de Lissajous pase a ser una línea fina en 45 grados (vea la fotografía 7-5).

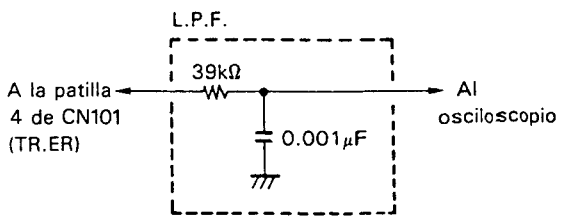


Fig. 7-2 L.P.F. de 4 kHz

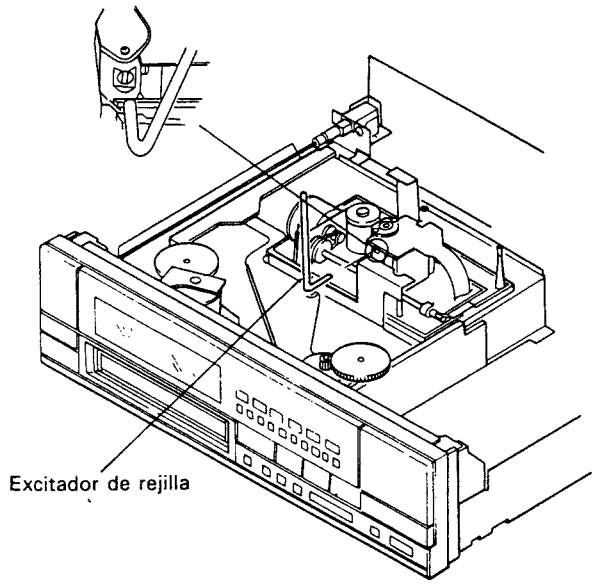
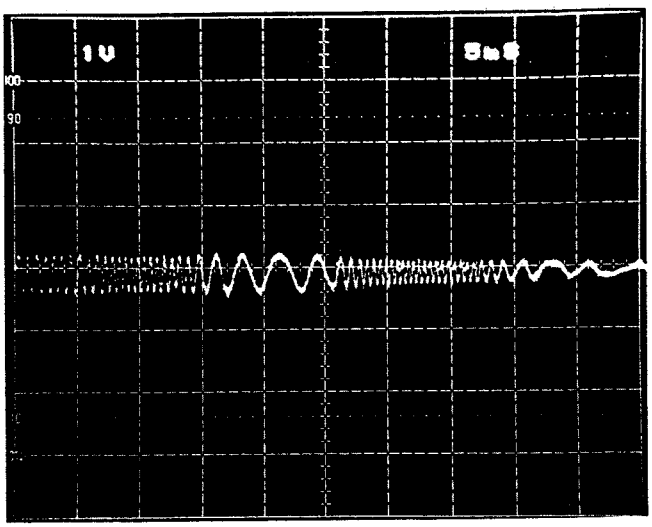
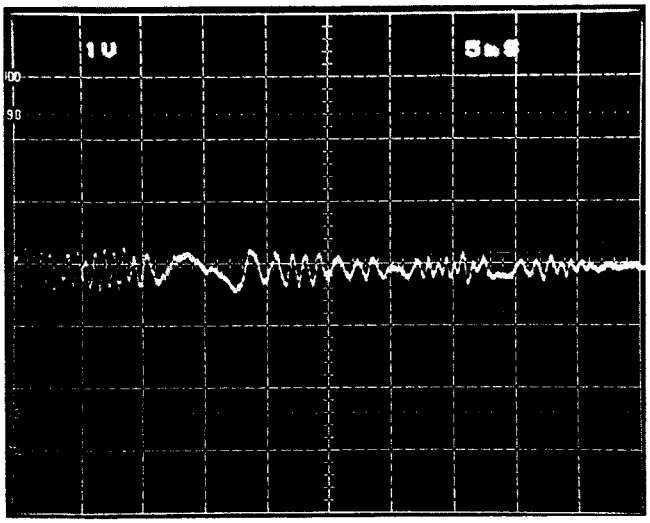


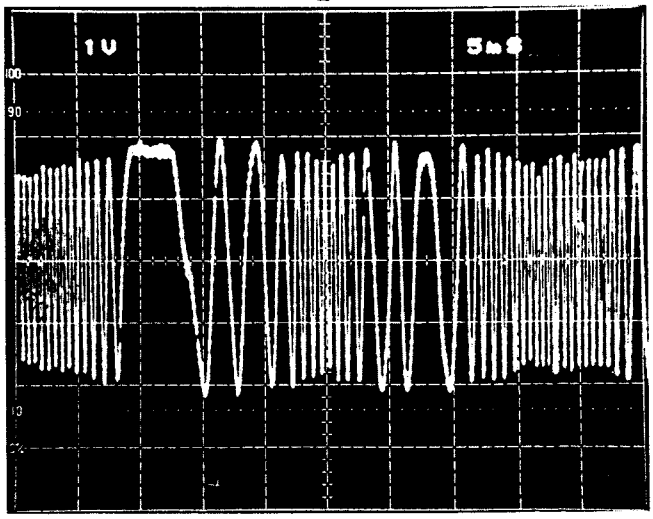
Fig. 7-3 Ajuste de la rejilla



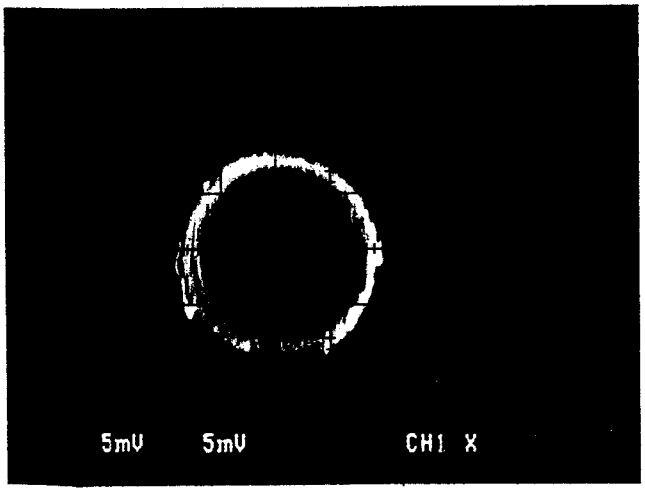
Fotografía 7-1
Envolvente pequeña y uniforme (punto NULL)



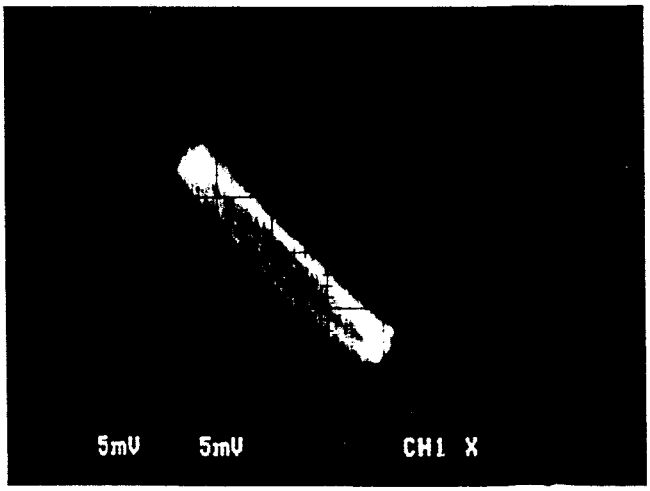
Fotografía 7-2
Envolvente pequeña pero gruesa (no el punto NULL)



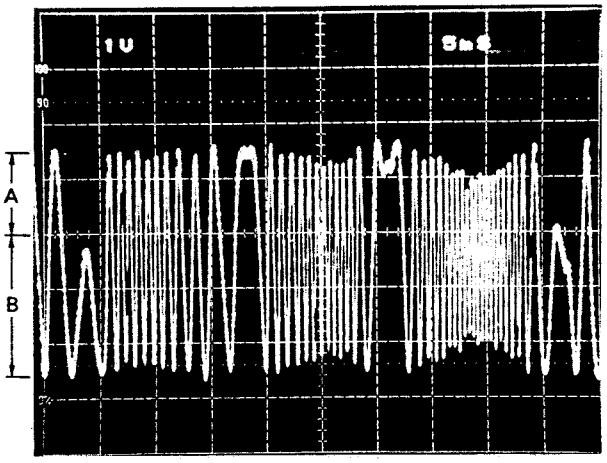
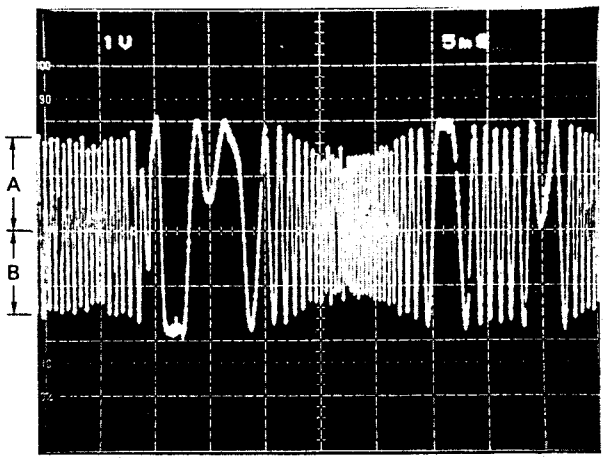
Fotografía 7-3
Amplitud máxima



Fotografía 7-4
Patrones de Lissajous (antes del ajuste)



Fotografía 7-5
Patrones de Lissajous (después del ajuste)

N°. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
5	**AJUSTE DEL EQUILIBRIO DE SEGUIMIENTO**					
	1V /div	10 ms /div	Patilla 4 de CN101 (TR.ER)	VR5 (TB.BL)	Amplitud positiva y negativa iguales (A = B)	• Presione la tecla MANUAL SEARCH FWD para mover el fonocaptor más cerca de la parte intermedia del disco. • Presione las teclas TRACK FWD y PLAY por turnos para iniciar las vueltas del disco. • Ajuste el nivel de tierra (GND) del osciloscopio en el centro. • Conecte el osciloscipio a la patilla 4 de CN101 TR.ER (error de seguimiento) a través de L.P.F. mostrado en la Fig. 7-2. Ajuste VR5 TR.BL (equilibrio de seguimiento) de modo que la amplitud positiva y negativa de la forma de onda sean iguales que en la fotografía 7-7.
	 Fotografía 7-6 A<B					 Fotografía 7-7 A=B
6	**AJUSTE PICK UP ÁNGULO**					
	0,2V/div Acoplamiento de CA	0,2 μs /div	Patilla 1 de CN105 (RF)	pick up ángulo ajuste tangencial	Mejor patrón de vista	• Presione las teclas TRACK FWD, PLAY y PAUSE por turnos para cerrar todos los ervomecanismos. (El indicador PAUSE deberá encenderse.) • Conecte el osciloscopio a la patilla 1 de CN105 RF (salida de RF) a través de un resistor de 50 kohmios si la forma de onda no es clara. • Ajuste el tornillo de ajuste pick up ángulo para obtener el mejor patrón de vista como en la fotografía 7-8. El punto óptimo de ajuste está en un punto intermedio entre los dos puntos desde donde empieza a deteriorarse el patrón de vista cuando el tornillo de ajuste tangencial se gira hacia la derecha o hacia la izquierda. Tornillo de ajuste ángulo

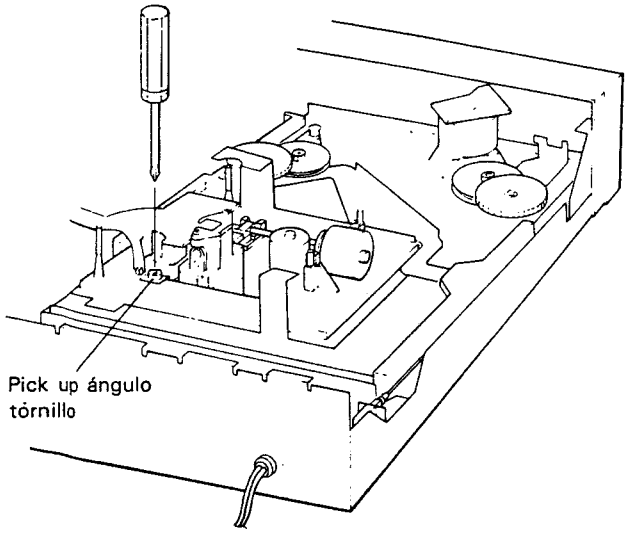
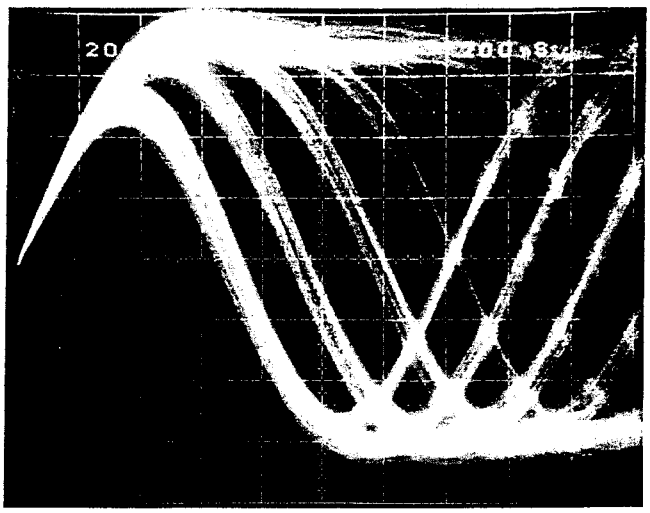
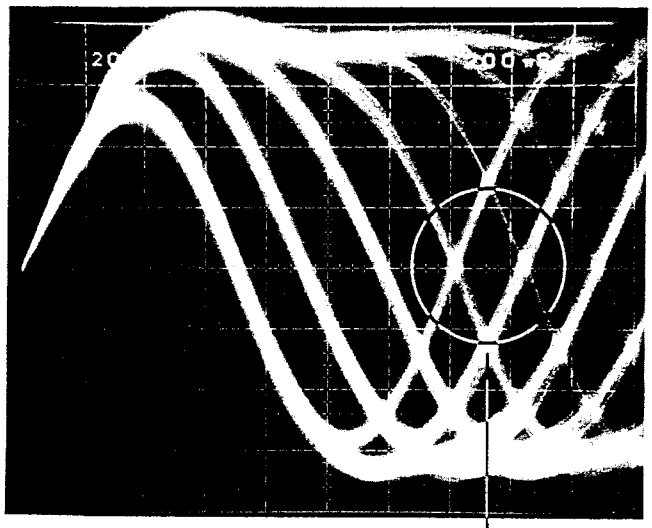


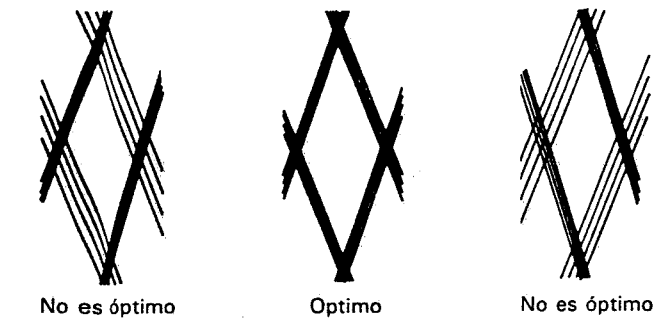
Fig. 7-5 Ajuste pick up ángulo



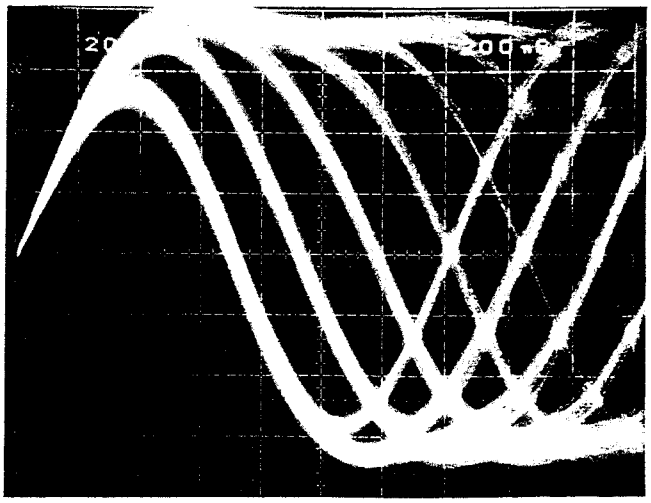
Fotografía 7-9



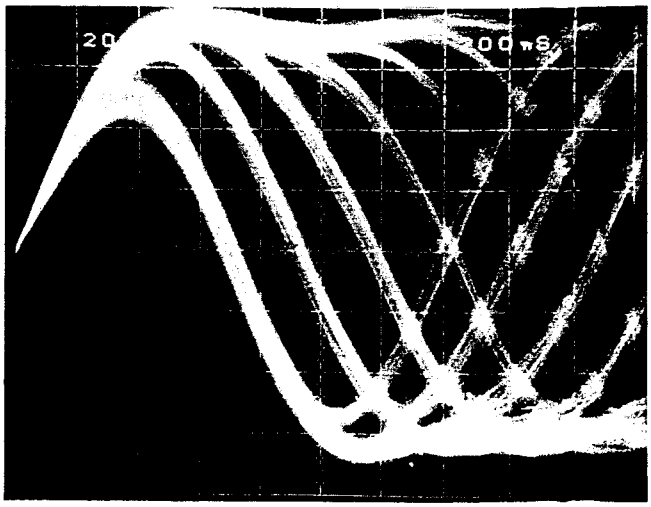
Parte a observarse



Fotografía 7-8



Fotografía 7-10



Fotografía 7-11

N°. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
7	**AJUSTE DE LA GANANCIA DE ENFOQUE (SIN EMPLEAR UN AJUSTADOR FTG)**					
	50 mV /div Canal 1 20 mV /div Canal 2 50 mV /div	0,5 ms /div Modo X-Y	Terminal de salida del osc. de AF Canal 1 Patilla 6 de CN101 (FO.IN) y salida del osc. de AF Canal 2 Patilla 1 de CN101 (FO.OT)	Control de salida del osc. de AF VR3 (FO.GA)	880Hz 0,2Vp-p Patrones de Lissajous simétricos	• Conecte unosciloscopio al terminal de salida del oscilador de AF y ajuste su salida a 880 Hz y 0,2 Vp-p. (La salida del oscilador de AF debe ajustarse antes de la conexión descrita a continuación.) • Presione las teclas TRACK FWD, PLAY y PAUSE por turnos para cerrar todos los servomecanismos. • Conecte el osciloscopio, oscilador de AF y un resistor al reproductor como se muestra en la Fig. 7-6. Ajuste el osciloscopo al modo X-Y. • Ajuste VR3 (FO.GA) (ganancia de enfoque) de modo que los patrones de Lissajous sean simétricos (vea la fotografía 7-13).

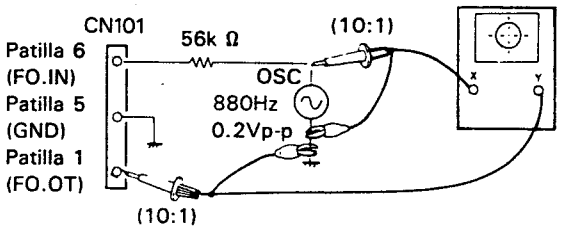
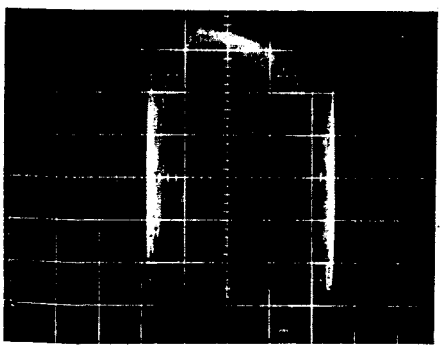
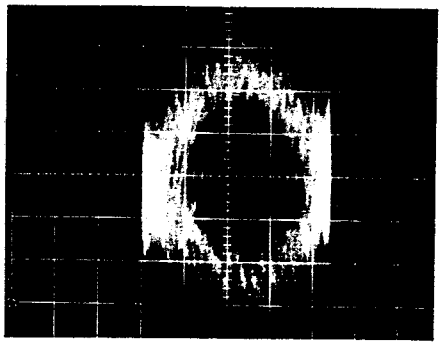


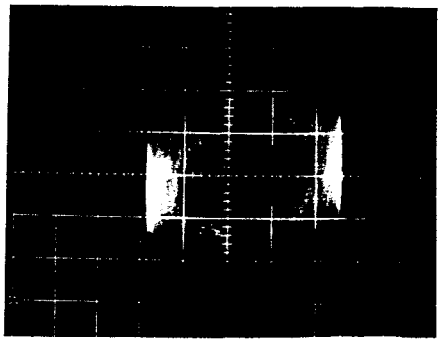
Fig. 7-6



Fotografía 7-12
Baja ganancia



Fotografía 7-13
Ganancia óptima



Fotografía 7-14
Alta ganancia

N°. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Ítemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
8	**AJUSTE DE LA GANANCIA DE SEGUIMIENTO (SIN EMPLEAR UN AJUSTADOR FTG)**					
	0,1 V /div	0,5 ms /div	Terminal de salida del osc. de AF	Control de salida del osc. de AF	1130Hz 0.4Vp-p	• Conecte un osciloscopio al terminal de salida del oscilador de AF y ajuste su salida a 1130 Hz y 0,4 Vp-p. (La salida del oscilador de AF debe ajustarse antes de la conexión descrita a continuación.) • Presione las teclas TRACK FWD, PLAY y PAUSE por turnos para cerrar todos los servomecanismos.
	Canal 1 50 mV /div Canal 2 50 mV /div	Modo X-Y	Canal 1 Patilla 7 de CN101 (TR.IN) y salida del osc. de AF Canal 2 Patilla 2 de CN101 (TR.OT)	VR4 (TR.GA)	Patrones de Lissajous simétricos	• Conecte el osciloscopio, oscilador de AF y un resistor al reproductor como se muestra en la Fig. 7-7. Ajuste el osciloscopo al modo X-Y. • Ajuste VR4 TR.GA (ganancia de seguimiento) de modo que los patrones de Lissajous sean simétricos (vea la fotografía 7-16.

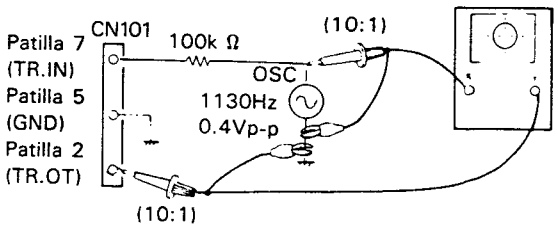
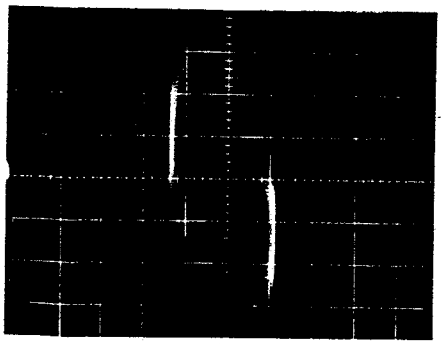
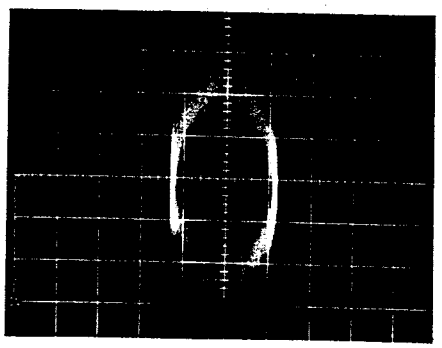


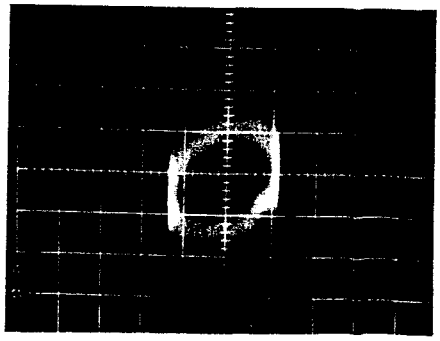
Fig. 7-7



Fotografía 7-15
Baja ganancia

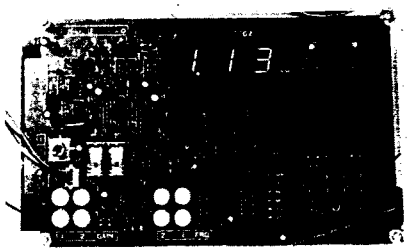


Fotografía 7-16
Ganancia óptima



Fotografía 7-17
Alta ganancia

N° de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
9	**AJUSTE DE LA GANANCIA DE ENFOQUE Y DE SEGUIMIENTO EMPLEANDO UN AJUSTADOR FTG**					
						• Conecte el interruptor de alimentación del ajustador FTG. EL interruptor está situado a la derecha del ajustador. Gire el selector del ajustador FTG a 1. El selector está situado a la izquierda del panel.
						• Conecte el osciloscopio a TP (punto de prueba) del ajustador FTG. El TP está situado a la derecha del selector.
				Potenc. de FREQ-1 del ajustador FTG		• Ajuste dos potenciómetros de FREQ-1 del ajustador FTG de modo que la frecuencia de salida pase a ser de 880 Hz. La frecuencia se indica con LEDs de 7 segmentos en el ajustador FTG.
	50 mV /div	0,5 ms /div	TP del ajustador FTG	Potenc. de GAIN-1 del ajustador FTG		• Ajuste dos potenciómetros de GAIN-1 del ajustador FTG de modo que la amplitud de la señal de salida sea de 0,2 Vp-p.
						• Gire el Selector del ajustador FTG a 2.
				Potenc. de FREQ-2 del ajustador FTG		• Ajuste dos potenciómetros de FREQ-2 del ajustador FTG de modo que la frecuencia de salida pase a ser de 1130 Hz.
	0,1 V /div	0,5 ms /div	TP del ajustador FTG	Potenc. de GAIN-2 del ajustador FTG		• Ajuste dos potenciómetros de GAIN-2 del ajustador FTG de modo que la amplitud de la señal de salida sea de 0,4 Vp-p.
						• Gire el Selector a la posición neutra (centro).
						• Conecte el conductor naranja del ajustador FTG a la patilla 6 de CN101 (FO.IN) del reproductor, el conductor marrón a la patilla 1 de CN101 (FO.OT), el conductor amarillo a la patilla 7 de CN101 (TR.IN), el conductor rojo a la patilla 2 de TP1 (TR.OT), y el conductor negro al chasis.
						• Presione las teclas TRACK FWD, PLAY y PAUSE por turnos para cerrar todos los servocircuitos.
				VR3 (FO.GA)	LED verde (JUST) encendido	• Gire el Selector a 1. Ajuste VR3 FO.GA (ganancia de enfoque) de modo que se encienda un LED verde (JUST).
				VR4 (TR.GA)	LED verde (JUST) encendido	• Gire el Selector del ajustador FTG a 2. Ajuste VR4 TR.GA (ganancia de seguimiento) de modo que se encienda el LED verde (JUST).



Fotografía 7-18 Ajustador FTG

N°. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procédure de réglage
10	**AJUSTE DE LA FRECUENCIA DE FUNCIONAMIENTO LIBRE DE VCO**					
	0,5 V /div	0,1 μs /div	Conductor de pin 8 de IC8 (TP6) del tablero de Main			• Conecte un osciloscopio al conductor de pin8 de IC8 (TP6) del tablero de Main. (Consulte la Fig. 7-9)
						• Presione las teclas TRACK FWD y PLAY por turnos para cerrar los servocircuitos de enfoque y del pivote.
						• Gire el selector AC-GND-DC del osciloscopio a DC.
					La forma de onda se sitúa en el centro	• Ajuste la posición vertical del osciloscopio de modo que la forma de onda quede situada en el centro. Nota: No es necesario ajustar el nivel de GND en el centro del osciloscopio en este ajuste. Sitúe simplemente la forma de onda en el centro del osciloscopio con el control de posición vertical.
						• Presione la tecla PAUSE para cerrar el servomecanismo de seguimiento.
				VL1	La forma de onda se sitúa en el centro	• Ajuste VL1 (bobina de VCO) con un excitador de núcleo de modo que la forma de onda quede situada en el centro.
					El nivel de CC de las formas de ondas no cambia	• Abra y cierre el servomecanismo de seguimiento presionando la tecla PAUSE algunas veces y verifique que el nivel de CC de las formas de ondas no haya cambiado.

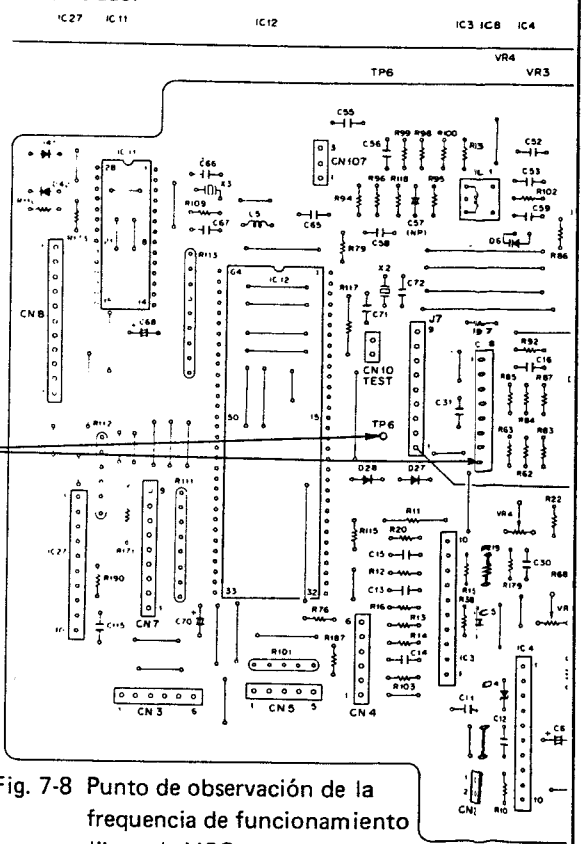


Fig. 7-8 Punto de observación de la frequencia de funcionamiento libre de VCO

8. DIFFERNCES BETWEEN THE PD-X99M AND PD-M6 UNITS (PD-M6, PD-6030)

8.1 DIFFERENCES FROM PD-M6 UNITS

1. The program for the system controller (PD3079) IC has been changed. In set-up mode, the focus ok signal is no longer verified before the spindle kick. (See the timing chart for set-up mode.)

2. FL Circuit

The random play display has been shifted to the FL.

8.2 EXPLANATION OF THE VARIOUS SECTIONS AND IC DATA

System Controller IC

PD3079 pin functions

PIN NO.	Symbol	Terminal name	I/O	Operation
1	Vss	–	–	GND
2	$\overline{RES}$	–	Input	CPU reset input — Reset ⌐ RUN
3	INT	WFCK	Input	
4	STBY	–	Input	+5V (CPU standby input) — Standby ⌐ RUN
5	XTAL	–	–	Built-In clock circuit input
6	EXTAL	–	–	〃
7	NUM	–	Input	GND (Used by the manufacturer)
8	TIMER	–	Input	Not used (connected to SENS)
9	A7	TEST	Input	Test mode switch input — Test ⌐ Normal
10	A6	Not used	Output	OPEN
11	A5	FOK	Input	Focus ok input — NG ⌐ OK
12	A4	MIRR	Input	Track/mirror surface detection signal input — On track ⌐ Mirror surface
13	A3	Not used	Output	OPEN
14	A2	XLT	Output	LSI control data latch pulse output — ⌐ Latch ⌐
15	A1	SENS	Input	LSI operation state multi-mode input
16	Aø	MUTE	Output	Muting output — OFF ⌐ ON
17	B7	CRCF	Input	Subcode Q CRCC check input — NG ⌐ OK
18	B6	SUBQ	Input	Subcode Q data input
19	B5	SCOR	Input	Subcode sync input — ⌐ Sync ⌐
20	B4	GFS	Input	Frame sync lock input — NG ⌐ LOCK
21	B3	RAOV	Input	RAM overflow input for jitter absorbence — OK ⌐ OVER
22	B2	Not used	Input	GND
23	B1	SRES	Output	Key/display microprocessor reset output — RUN ⌐ Reset
24	Bø	DCNT	Input	Disc count pulse input — 1 ⌐ 6
25	TX (So)	DATA	Output	LSI control data serial output — 0 1 2 3 4 5 6 7
26	C6	DCHM	Input	Disc selector home switch input — NOT ⌐ HOME
27	CK	CLK	Output	Serial transmission clock switch input

PIN NO.	Symbol	Terminal	I/O	Operation
28	C4	LPS1	Input	Load position — Clamp | Home
29	C3	LPS2	Input	SW input — Load | Eject
30	C2	MZS1	Input	Magazine judgment switch input — Magazine in | Eject
31	C1	MZS2	Input	SW input — 6 | 1
32	Cø	INSD	Input	Slider inside switch input — INSIDE | NOT
33	Vcc	—	—	+5V
34	D1	KDø	Input	Main unit key code input (LSB)
35	D2	KD1	Input	"
36	D3	KD2	Input	"
37	D4	KD3	Input	"
38	D5	KD4	Input	" (MSB)
39	D6	KS	Input	Main unit key strobe input
40	D7	STS	Input	Display data transmission enable input — ON | OFF
41	Eø	SCK	Output	Display data serial transmission clock — Inhibited | Enabled
42	E1	SD	Output	Display data serial output
43	E2	Not used	Output	OPEN
44	E3	LIN	Output	Disc loading — IN | Brake
45	E4	LOUT	Output	in/out output — | OUT
46	E5	DSUP	Output	Disc select — UP | Brake
47	E6	DSDW	Output	up/down output — | DOWN
48	E7	Not used	Output	OPEN
49	Fø	PAUS	Output	Pause LED output — OFF | ON
50	F1	PLAY	Output	Play LED output — OFF | ON
51	F2	Not used	Output	OPEN
52	F3	DIRC	Output	Track jump direction reverse output — Reverse | CLOSE
53	F4	DEMP	Output	Deemphasis on/off output — ON | OFF
54	F5	(DKSY)	Output	Deck synchro output (option) — STOP | PLAY
55	F6	MRIH	Output	Mirror signal supply inhibit output — Enabled | Inhibited
56	F7	LDON	Output	Laser diode on/off output — OFF | ON
57	G7	RKS	Input	Remote control key strobe input — ON | OFF
58	G6	RKD6	Input	Remote control input (MSB)
59	G5	RKD5	Input	"
60	G4	RKD4	Input	"
61	G3	RKD3	Input	"
62	G2	RKD2	Input	"
63	G1	RKD1	Input	"
64	Gø	RKDø	Input	" (LSB)

• FL Circuit

From when the REP is switched on until the REP segments light up

When the REP is switched on, when the G1 output is high, then a high signal is input to Pin 30 of IC201 to let IC 201 know that the REP switch was pressed. IC201 sets the KS pin (Pin 11) low and outputs data to IC12 through Pins KD0-KD4. IC12 receives this data, verifies that the STS pin of IC201 is high, then outputs from Pins SCK and SD the instruction to IC201 to light up the REP segments. IC201 receives this instruction (the STS pin goes low) and if the G1 pin is high, outputs a high level signal at the A pin (Pin 10) to light up the REP segments. (See the Figure.)

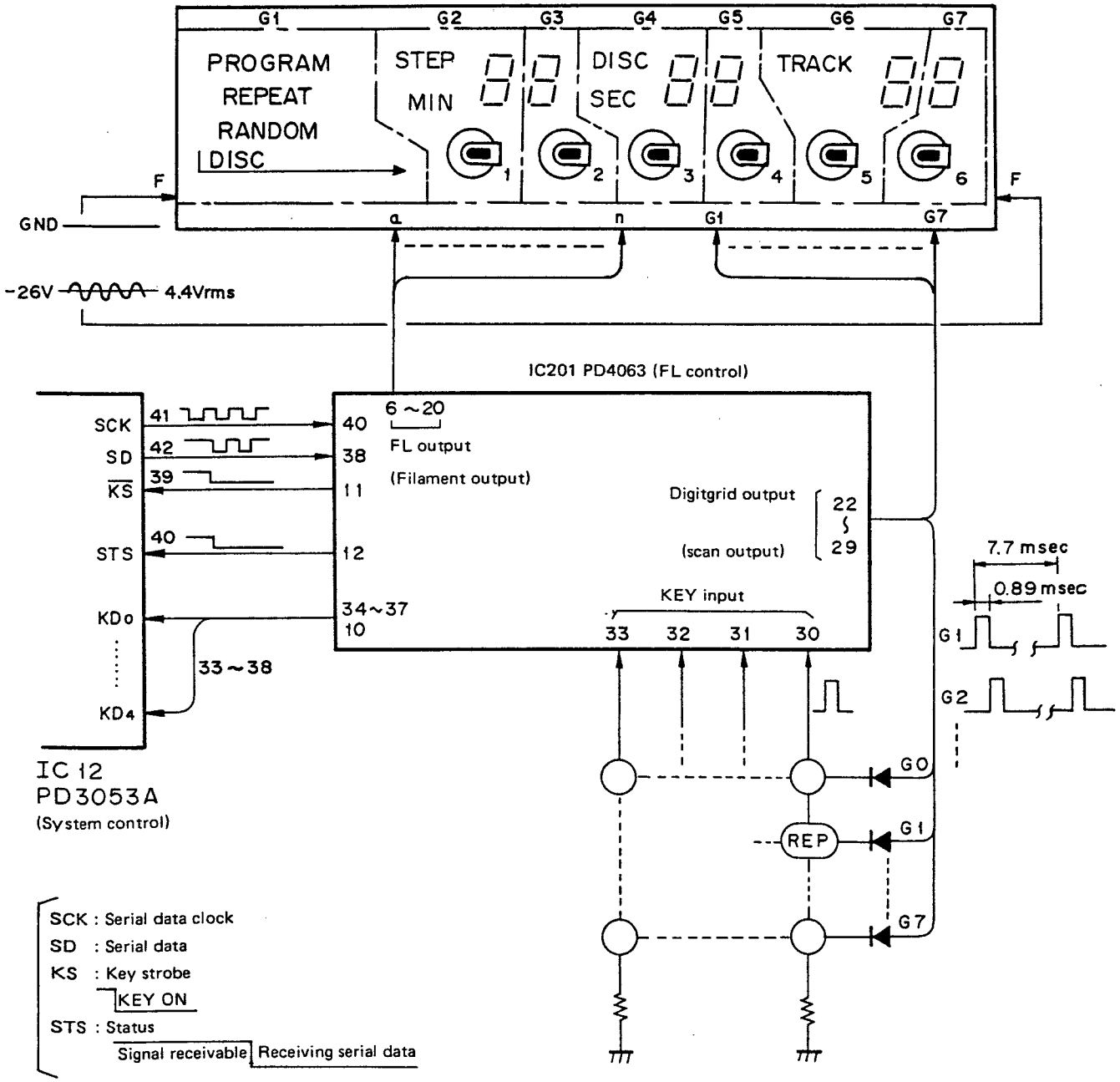


Fig. 8-1 FL circuit

• Demodulator Circuit

The demodulator circuit is a single-chip CX23035 LSI with a few additional external circuits. Its functions are:

1. Regeneration of the beat clock with an EFM-PLL circuit
2. EFM data demodulation
3. Detection, storage, and insertion of frame synchronization signals
4. Detection and correction of strong errors
5. Interpolation by averaging and holding the previous value
6. Subcode signal demodulation and detection of errors in subcode Q
7. Spindle motor CLV servo
8. 8-bit tracking counter
9. Serial bus CPU interface

Here is an explanation of the discrete external circuits.

The external circuits are a loop filter, its amp, and a VCO. Output corresponding to the error is obtained from PDO (Pin 11) of the CX23035. The loop filter has extremes of 70 Hz and a zero point of 1.6 kHz. The output from the loop filter is amplified by the error amp and input to the VCO. The VCO's main amplifier is in the CX23035. Signals are output from the MDP and MDS for all the CX23035's CLV servo modes.

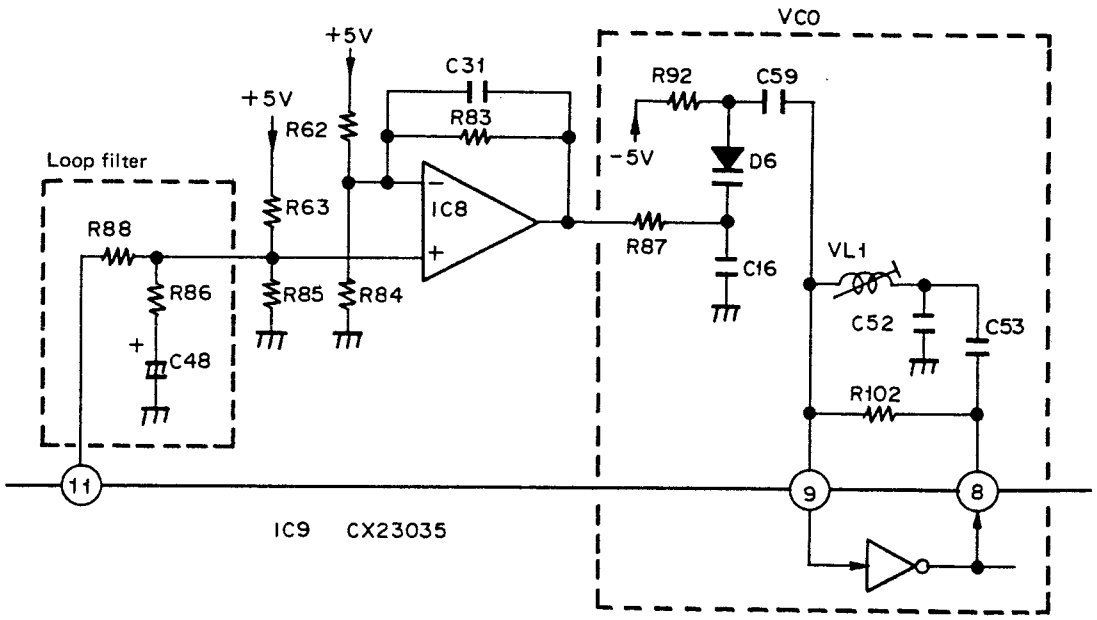


Fig. 8-2 Demodulator circuit

The mixed filter section is an LPF with a cut-off frequency of about 500 Hz, while the loop filter is an LPF with a cut-off frequency of about 300 kHz. The FSW switches the cut-off frequency of the mixed filter for the CLV servo motor to about 20 Hz. MON sets the loop filter output to 0V. It operates in stop mode.

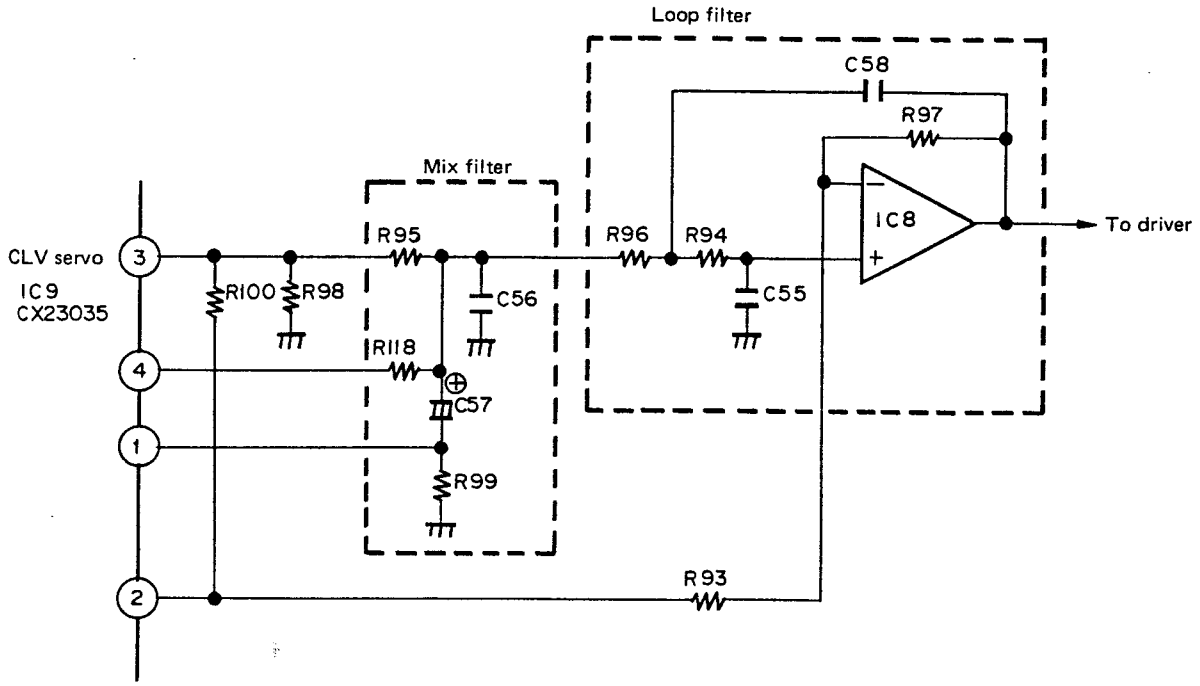


Figure 8-3 Mixed filter section and loop filter circuit

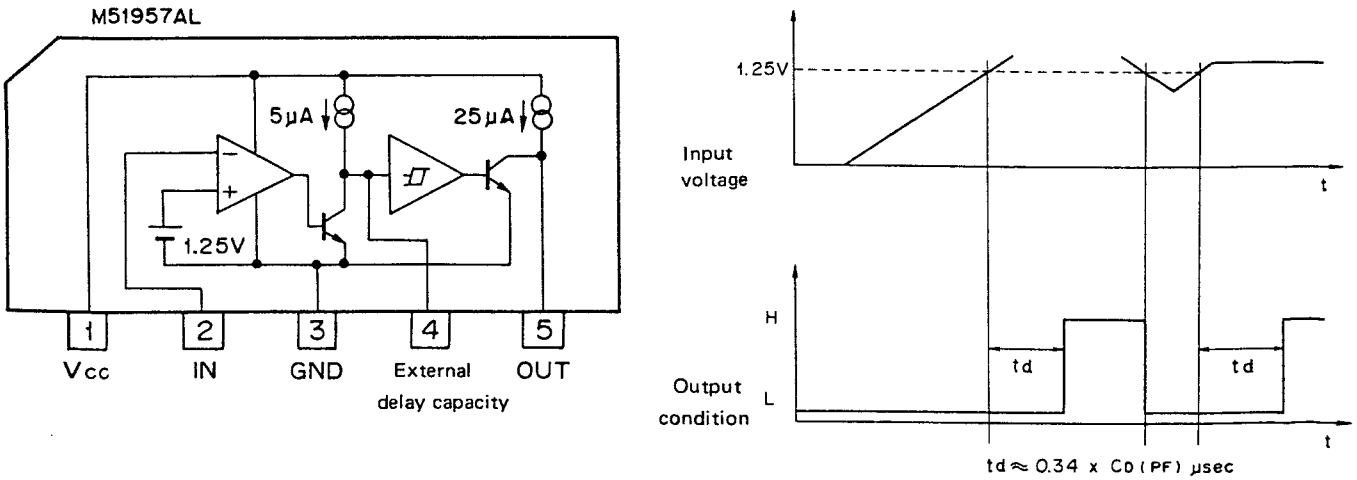
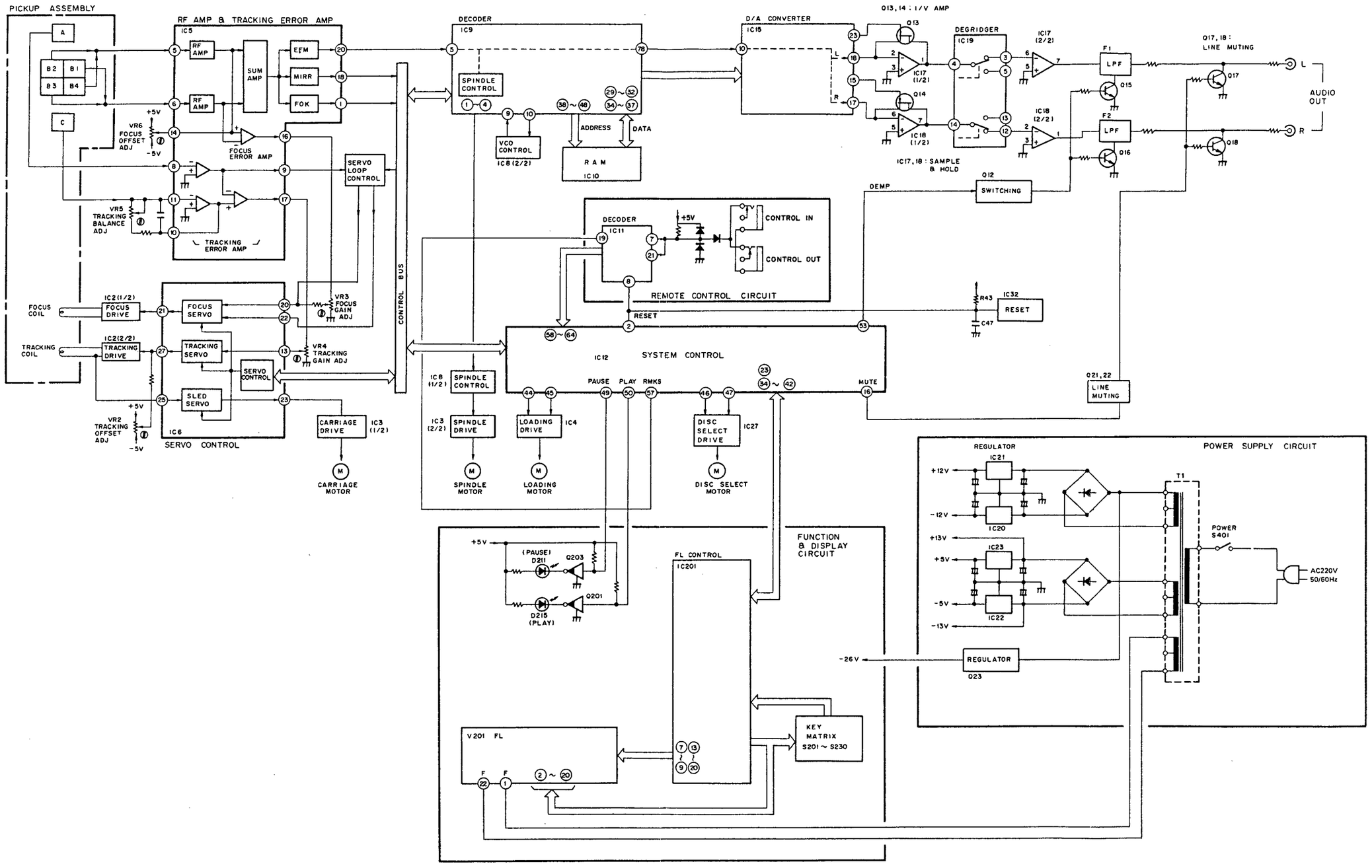
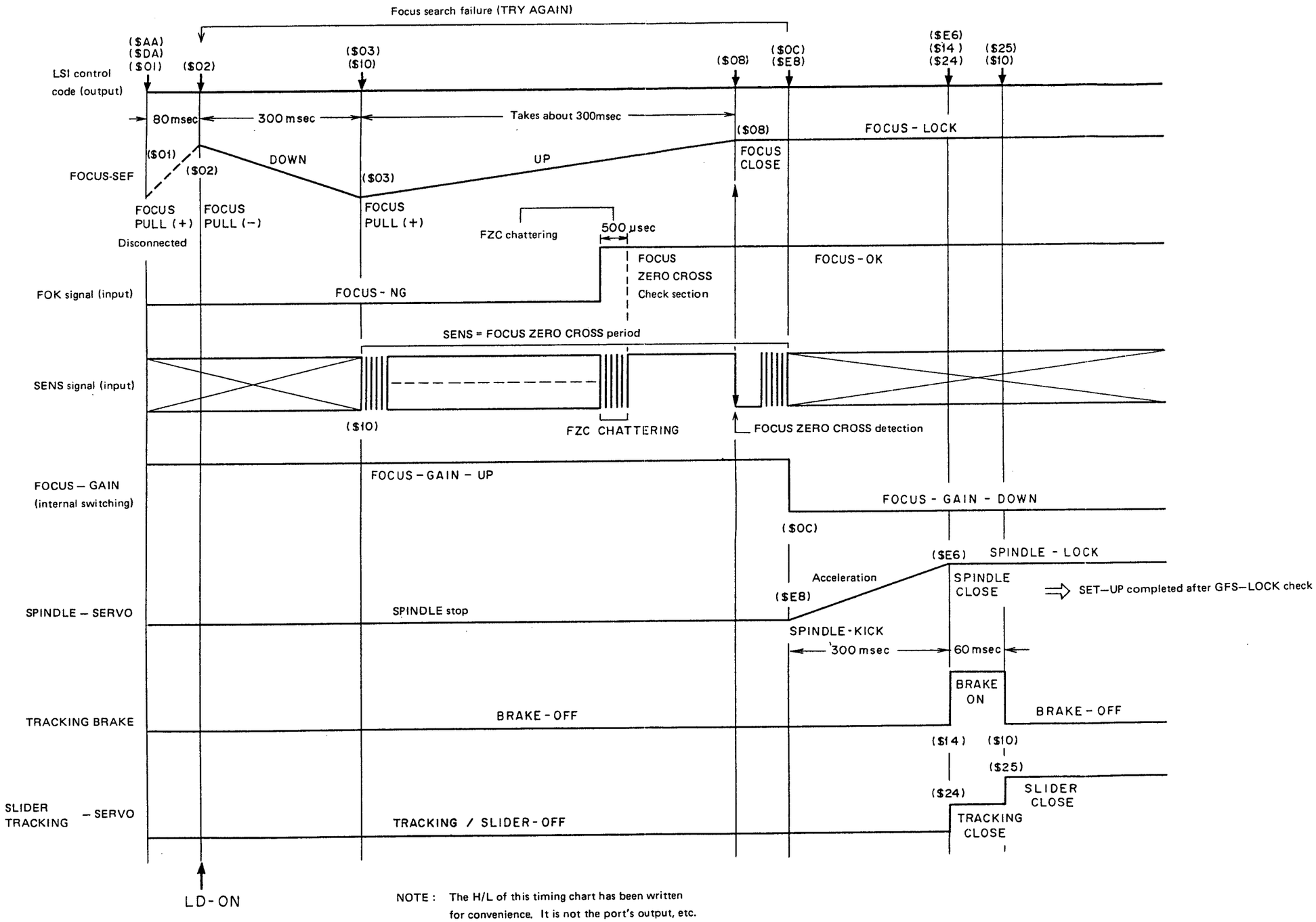


Fig. 8-4 M51957AL block diagram and operation figure

• BLOCK DIAGRAM



SET-UP Mode, Timing Chart



NOTE : The H/L of this timing chart has been written for convenience. It is not the port's output, etc.

9. FOR HB AND SD TYPES

The PD-X99M/HB and SD types are the same as the PD-X99M/HEM type with the exception of the following sections.

Mark	Symbol & Description	Part No.			Remarks
		PD-X99M			
		HEM type	HB type	SD type	
⚠ ⊙	Main board assembly	PWZ1165	PWZ1165	PWZ1170	
	Audio board assembly	Non supply	Non supply	Non supply	
⚠ ⊙	Function board assembly	PWZ1167	PWZ1167	PWZ1172	
⚠	Power switch board assembly	Non supply	Non supply	Non supply	
⚠	Transformer board assembly	Non supply	Non supply	Non supply	
⚠	AC power cord	PDG1008	PDG1010	RDG1003	
	Operating instructions				
	(English/German/French/Italian)	PRE1013	.....	.....	
	(English)	.....	PRB1011	PRB1011	
⚠	Line voltage selector				
	(110V/120-127V/220V/240V)	.....	.....	PSB1002	
⚠ ★	Power transformer (220V/240V)	PTT-250	PTT-250	.....	
⚠ ★	Power transformer				
	(110V/120V-127V/220V/240V)	.....	.....	PTT-251	

9.1 FOR HB TYPE

Line Voltage Selection

Line Voltage can be changed with following steps.

1. Disconnect the AC power cord.
2. Remove the top cover.
3. Change the connection of the transformer board assembly Jumper wire. (See Fig. 9-1)
4. Stick the line voltage label on the rear panel.

Part No.	Description
AAX-193	220V label
AAX-192	240V label

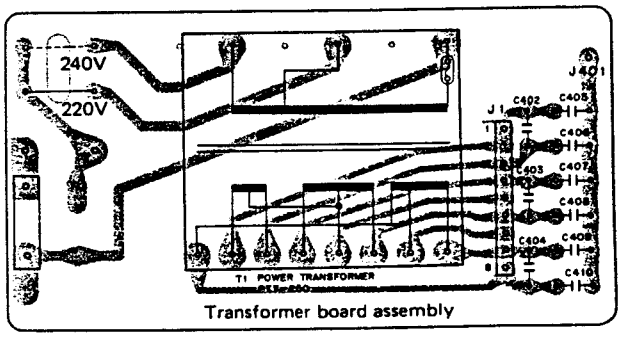
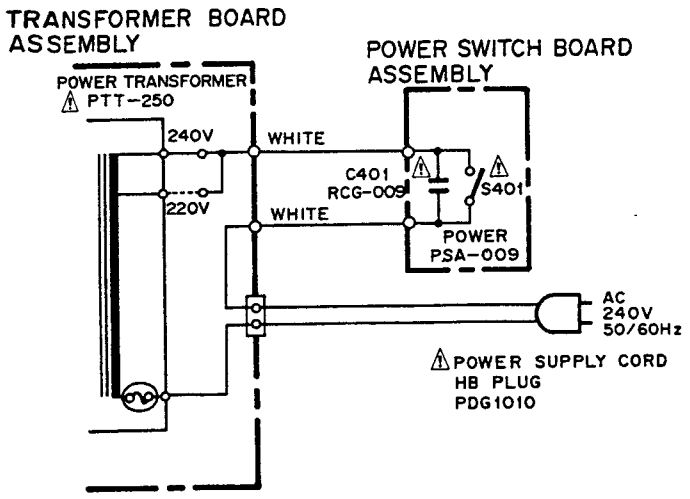


Fig. 9-1 Line voltage selection

Schematic diagram



9.2 FOR SD TYPE

Electrical parts list

Main Board Assembly
The component parts of the SD type Main Board assembly (PWZ1170) and the HEM type Main Board assembly (PWZ1165) are identical.

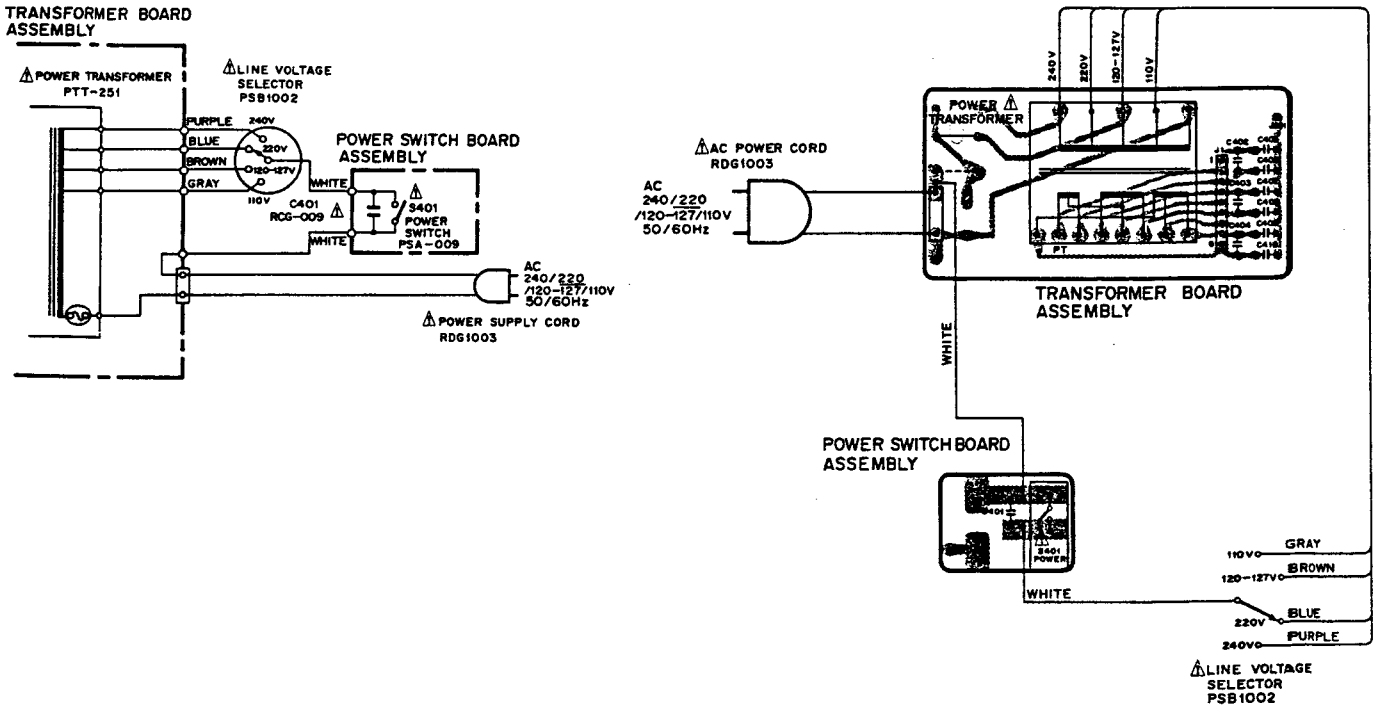
Audio Board Assembly
The component parts of the SD type Audio Board assembly (Non-supply) and the HEM type Audio Board assembly (Non-supply) are identical.

Function Board Assembly
The component parts of the SD type Function board assembly (PWZ1172) and the HEM type Function board assembly (PWZ1167) are identical.

Power Switch Board Assembly
The component parts of the SD type Power switch board assembly (Non-supply) and the HEM type Power switch board assembly (Non-supply) are identical.

Transformer Board Assembly
The component parts of the SD type Transformer board assembly (Non-supply) and the HEM type Transformer board assembly (Non-supply) are identical.

Schematic diagram and P.C.Boards connection diagram



SAFETY INFORMATION

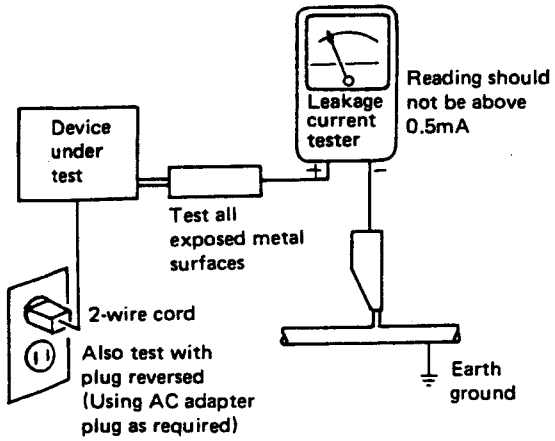
(FOR MODEL KU ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Leakage current tester
Reading should not be above 0.5mA
Device under test
Test all exposed metal surfaces
2-wire cord
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

(FOR MODEL HEM & HB ONLY)

VAROITUS!
LAITE SISÄLTÄÄ LASERDIODIN, JOKA LÄHETTÄÄ NÄKYMÄTÖNTÄ, SILMILLE VAARALLISTA INFRAPUNASÄTEILYÄ LAITTEEN SISÄLLÄ ON LASERDIODIN LÄHEISYYDESSÄ KUVAN 1. MUKAINEN VAROITUSMERKKI.

LASER
Kuva 1
Lasersateilyn varoitusmerkki

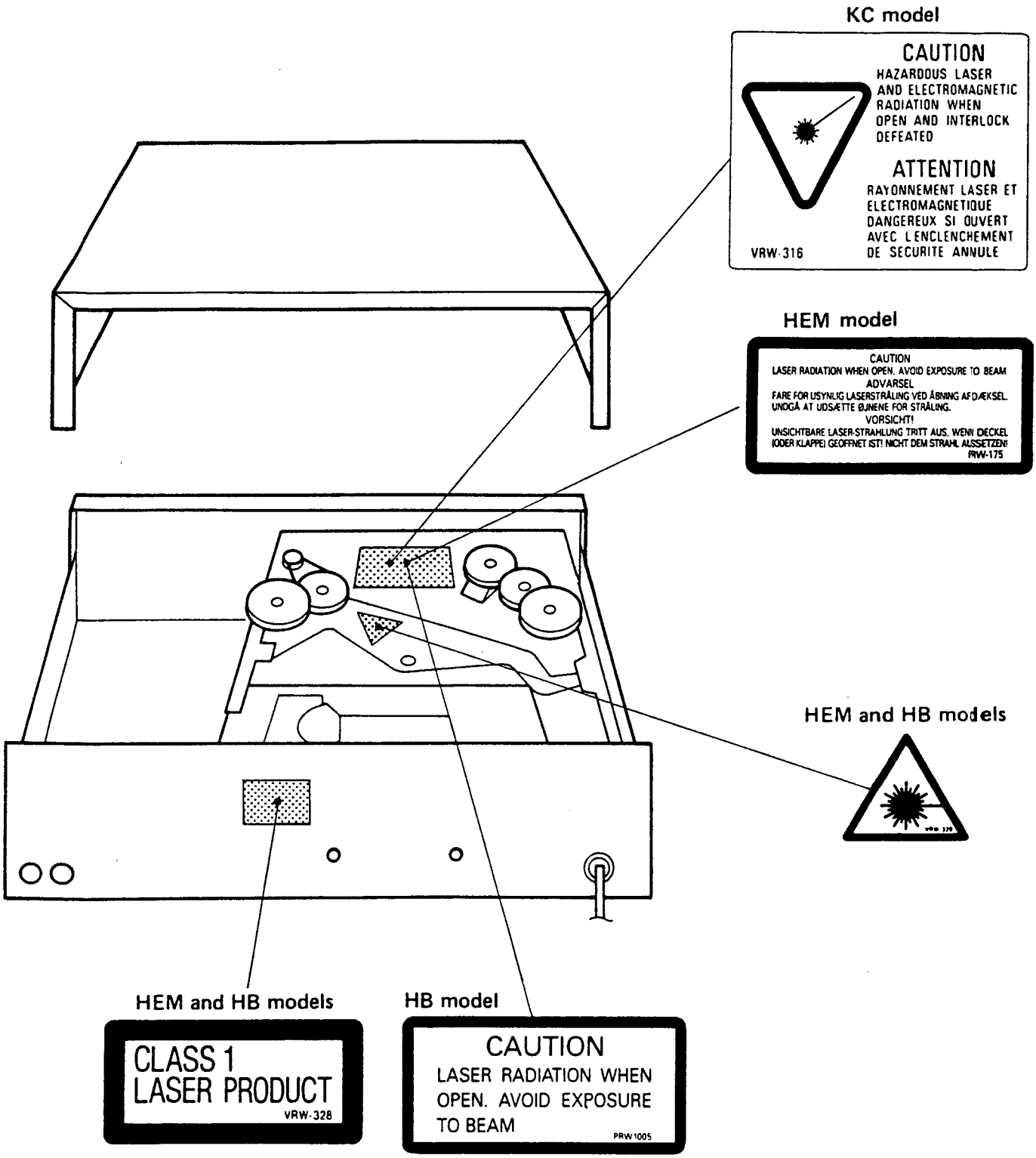
WARNING!
DEVICE INCLUDES LASER DIODE WHICH EMITS INVISIBLE INFRARED RADIATION WHICH IS DANGEROUS TO EYES. THERE IS A WARNING SIGN ACCORDING TO PICTURE 1 INSIDE THE DEVICE CLOSE TO THE LASER DIODE.

LASER
Picture 1
Warning sign for laser radiation

ADVERSEL:
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGÅ UDSAETTELSE FOR STRÅLING.

IMPORTANT
PIONEER COMPACT DISC PLAYER APPARATUS CONTAINS LASER OF HIGHER CLASS THAN 1. ALL OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

LABEL CHECK


KC model
CAUTION
HAZARDOUS LASER AND ELECTROMAGNETIC RADIATION WHEN OPEN AND INTERLOCK DEFEATED
ATTENTION
RAYONNEMENT LASER ET ELECTROMAGNETIQUE DANGEREUX SI OUVERT AVEC L'ENCLENCHEMENT DE SECURITE ANNULE
VRW-316
HEM model
CAUTION
LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM
ADVARSEL
FARE FOR USYNLIG LASERSTRÅLING VED ÅBNING AFDÆKSEL. UNDGÅ AT UDSÆTTE ØJNENE FOR STRÅLING.
VORSICHT!
UNSICHTBARE LASER-STRAHLUNG TRITT AUS, WENN DECKEL (ODER KLAPPE) GEOFFNET IST! NICHT DEM STRAHL AUSSETZEN!
PRW-175
HEM and HB models
HEM and HB models
CLASS 1
LASER PRODUCT
VRW-328
HB model
CAUTION
LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM
PRW1005